Youth unemployment in the context of the European Union

Doctoral dissertation submitted to the Faculty of Economics and

Business for the degree of

PhD in *Economics and Business*

at the

Universidad Autónoma de Madrid

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Economics Madrid, March 2019

A mi familia y a todas las personas que han creído en mí

Agradecimientos (Acknowledgments)

Aunque el agradecimiento ha estado presente cada uno de los días de la elaboración de este trabajo, no siempre ha sido manifestado explícitamente y es en este momento cuando procede hacerlos patentes, por toda la ayuda recibida a lo largo de estos años dedicados a la realización del doctorado.

Las primeras palabras de agradecimiento van dirigidas a mis dos directores de tesis, los Catedráticos Santos Miguel Ruesga Benito y Fernando González Laxe, cuya entrega y apoyo han sido incondicionales. Ambos han supuesto un referente que, sin duda, me acompañará a lo largo de mi carrera. Más allá de su reconocimiento académico y de lo mucho que he aprendido de ellos, su calidad humana ha ido pareja a sus consejos y ha sido de gran ayuda en este trayecto de muchas horas de trabajo bajo su dirección, sugerencias y acompañamiento.

Agradezco a la Facultad de CC. Económicas y Empresariales de la Universidad Autónoma de Madrid, especialmente al Departamento de Estructura Económica y Economía del Desarrollo, que ha sido estos años mi hogar y mi familia académica. A Maribel Heredero, a Julimar da Silva, a Laura Pérez, a Luis Collado, a Luis Enrique Alonso, a Cristobal Torres, a Antonio Vázquez y a todos los compañeros y compañeras por su apoyo y ánimo. Muy especialmente quiero agradecer al doctor Ernesto Rodríguez Crespo que ha demostrado su amistad desde nos hemos encontrado en el camino académico.

Asimismo, agradezco a mis compañeros de la UAM encargados de tareas administrativas, por su ayuda y paciencia en los muchos trámites que han sido necesarios para finalizar este trabajo, muy especialmente a Lola Vallejo y a Belén Duarte, a quienes quizá no haya sabido transmitirles cuanto he valorado su paciencia y apoyo.

También agradezco a la Universidade da Coruña y al grupo de investigación EDaSS (Economic Development & Social Sustainability), que me han acompañado y alentado en este camino.

Por otra parte, debo agradecer el apoyo financiero recibido para la realización de esta tesis doctoral, a través de la Beca FPI (FPI-UAM 2016), así como la ayuda recibida para las estancias de investigación, lo que me ha permitido dedicarme a tiempo completo a esta investigación.

Agradezco a Diana Mihaela Tirca y a Diego Sánchez Ancoechea sus valiosos consejos y su acogida en las universidades de Tragu-Jiu (Rumanía) y Oxford (Reino Unido), universidades que han sido mi casa durante los meses de estancias de investigación.

A mis padres, a mi hermano Ignacio y a mis abuelos. A mi familia en A Coruña, que siempre han estado muy cerca, aunque nos separasen muchos kilómetros. A mis amigos, que han sido mi más fuerte apoyo y a quienes he cansado repetidamente con mis continuas referencias a este trabajo. A la familia de Santos Ruesga, Raquel y Jimena, que también han sido la mía en Madrid.

También agradezco la ayuda recibida con los comentarios y sugerencias respecto a los trabajos que he presentado en los congresos: IV Jornadas Iberoamericanas de RRHH e RSC, A Coruña, España (febrero, 2015); II (Azuga, RumanÍa, abril, 2015) Information society and sustainable development, III (Polovragi, Gorj County, Rumanía, Abril, 2016), IV y V (Targu-Jiu, Rumanía, 2017) ISSD - Internacional Conference "Information Society and Sustainable Development"; XII (noviembre, 2015), XIII (noviembre, 2016), XIV (noviembre 2017), XV (noviembre, 2018) International Scientific Conference ECOTREND, Targu-Jiu – Rumanía; (noviembre, 2015) II (Porto Alegre, Brasil, noviembre 2015) y III (Cartagena de Indias, Colombia, noviembre, 2017) Reunión Iberoamericana de Socio-Economía RISE-SASE; 8th International Conference on Competitiviness and Stability in the Kwoledge-based Economy, Craiova, Rumanía (octubre, 2016); XXIV Encuentro de Economía Pública (Toledo, enero, 2017); V (octubre, 2016, A Coruña) y VI (mayo, 2017, A Coruña) y VII (noviembre, 2018 Madrid) Intenational Conference on Economic Development and Social Sustainability (EDaSS); XVII Conference on International Economics (A Coruña, junio 2016); 28th Annual Meeting (Berkeley, California, Estados Unidos, junio, 2016), 29th Annual Meeting (Lyon, France, junio-julio 2017), 30th Annual Meeting (Kyoto, Japón, junio, 2018) SASE - Society for the Advancement of Socio-Economics.

Del mismo modo, agradezco las inestimables aportaciones de los revisores anónimos de los trabajos publicados que se presentan en esta Tesis Doctoral (y otras publicaciones complementarias) y a los comentaristas de los trabajos que han sido presentados en diversos congresos nacionales e internacionales, que han sido muy valiosas para mejorar la calidad de los mismos.

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Abbreviations

AROPE – People at risk of poverty or social exclusion

CEDEFOP – Centre for the Development of Vocational Training

DWA – Decent Work Agenda

EFILWC – European Foundation for the Improvement of Living and Working Conditions

EU – European Union

EUROSTAT – European Statistical Office

EWCS – European Working Conditions Survey

ICT – Information and Communication Technologies

ICTsFE – Formal education on Information and Communication Technologies

ICTsFE – Informal education on Information and Communication Technologies

ILO – International Labour Office

IMF – International Monetary Fund

IT – Information Technologies

NEETs – Young People not in Employment, Education or Training

OCDE – Organisation for Economic Co-operation and Development

SEM – Structural Equations Modeling

WEF – World Economic Forum

Short Summary - Abstract

The doctoral dissertation "Youth Unemployment in the Context of the European Union" consists of research focused on the nature of and problems related to youth unemployment in the framework of the European Union, with the aim of understanding its main determinants in order to identify the key factors in the design of public policies in order to solve this problem.

It has been carried out using a quantitative approach, based on secondary data obtained from EUROSTAT and primary data from a survey conducted specifically for this research. Methodological techniques have been focused on the analysis of the causal relationships between latent variables, for which structural equations modeling (SEM) has been used, due to their suitability in constructing variables that cannot be directly measured and explaining the causal relationships between them, by means of linear regression analysis. This methodology has been complemented with others, such as the comparison of means analysis, in order to study the common characteristics or group differences for specific points.

In the era of the so-called "Knowledge Society", the fundamental aspects related to youth unemployment focus on 1) the role played by education and technology, 2) in the socio-economic environment in which people are living, 3) the specific situation of young people and the risk of falling into discouragement and 4) achieving well-being at work and in life in general. These aspects have been analyzed in four scientific papers that constitute four independent research articles, included in this dissertation.

In this thesis, these topics have been analyzed and published in four indexed scientific journals (three of them in the Journal of Citation Reports - JCR and one in the Scimago Journal Citation SJR - Scopus), with the titles: "A New Educational Pattern in Response to New Technologies and Sustainable Development. Enlightening ICT Skills for Youth Employability in the European Union", "Smart Cities for Wellbeing: Youth Employment and their Skills on Computers", "Sustainable Development, Poverty and Risk of Exclusion for Young People in the European Union: The Case of NEETs" and "Wellbeing at Work: Self-perception of Workers from a Gender Perspective".

The main results and conclusions indicate that the achievement of individual, labor and social well-being, and the achievement of a balanced, inclusive and sustainable society, is

an objective that is linked to the solution of certain problems, such as the one analyzed here, youth unemployment. Consequently, future policies must consider the different profiles of vulnerable social groups to achieve the objective of sustainable development.

Resumen de la tesis doctoral (short summary in Spanish)

La tesis doctoral "El desempleo juvenil en el contexto de la Unión Europea" consiste en una investigación centrada en la naturaleza y los problemas relacionados con el desempleo juvenil en el marco de la Unión Europea, con el objetivo de comprender sus principales determinantes para identificar los factores clave que permitan diseñar políticas públicas dirigidas a resolver este problema.

Se ha llevado a cabo a través de un enfoque cuantitativo, basado en datos secundarios obtenidos de EUROSTAT y datos primarios de una encuesta realizada específicamente para esta investigación. Las técnicas metodológicas se han centrado en el análisis de las relaciones causales entre variables latentes, para las cuales se ha utilizado el modelo de ecuaciones estructurales (SEM), por su idoneidad para construir variables que no pueden medirse directamente y explicar las relaciones causales entre ellas, por medio del análisis de regresión lineal. Esta metodología, se ha complementado con otras, como el análisis de comparación de medias, al objeto de estudiar las características comunes o diferencias grupales para puntos específicos.

En la era de la llamada "Sociedad del Conocimiento", los aspectos fundamentales relacionados con el desempleo juvenil se centran en 1) el papel desempeñado por la educación y la tecnología, 2) en el entorno socioeconómico en el que se encuentra la población, 3) la situación de los jóvenes y el riesgo de caer en el desaliento y 4) lograr el bienestar en el trabajo y en la vida en general. Estos aspectos se han analizado en cuatro artículos de investigación independientes, incluidos en esta tesis doctoral.

En esta tesis se han analizado estos temas y se han plasmado en cuatro publicaciones en revistas científicas indexadas (tres de ellas en el Journal of Citation Reports – JCR y una en Scimago Journal Citation SJR – Scopus), bajo los títulos de "A new educational pattern in response to new technologies and sustainable development. Enlightening ICT skills for youth employability in the European Union", "Smart Cities for wellbeing: Youth employment and their skills on computers", "Sustainable development, poverty and risk of exclusion for young people in the European Union: the case of NEETs" y "Wellbeing at work: self-perception of workers from a gender perspective".

Los principales resultados y conclusiones indican que el logro del bienestar individual, laboral y social, y el de una sociedad equilibrada, inclusiva y sostenible, es un objetivo vinculado a la solución de ciertos problemas, como el que se analiza aquí sobre el paro juvenil. En consecuencia, las políticas futuras deben considerar los diferentes perfiles de los grupos sociales vulnerables para lograr el objetivo del desarrollo sostenible.

INTRODUCTION

1. Introduction

Under the eighth article of the Procedure relating to the commission, defense and evaluation of the doctoral dissertation at the Autonomous University of Madrid[1] ("Doctoral dissertations presented as a compendium of publications"), the thesis "Youth Unemployment in the Context of the European Union" is presented. It includes four articles. Three of them have been published in journals indexed in the Journal Citation Reports (JCR) and one in the Scimago Journal Citation (SJR / Scopus). All of them have been brought to completion during the period of the tutelage of the doctorate program and have been published after the date of enrolment in the doctorate studies (Article 8.1 of the aforementioned procedure).

The dissertation is composed of seven chapters. It begins with a general introduction (Chapter 1), which summarizes the papers presented, justifies the subject and explains the author's original contribution, in accordance with regulations (Art. 8.2. a). Likewise, in this introduction, the link between publications is pointed out, both in the thematic and methodological aspects. Chapter 2 details the general objectives and the methodology used in the papers presented, while Chapter 3 presents a theoretical and empirical approach to the problem of youth unemployment in the context of the European Union.

Chapter 4, entitled "Education, Technology and Youth Employment", analyzes specific characteristics of youth employment in general terms and more specifically in aspects related to Information and Communication Technologies (ICT), from both the influence at an individual level as well as in relation to the social and economic environments in which young people develop their activity. Thus, this chapter includes the full copy of two publications that study the aforementioned topics, which are identified with the first two contributions and which refer to the influence of ICT on youth employment, analyzed from two complementary aspects. On the one hand, the importance of young people having ICT knowledge or training as a determining factor for accessing employment, and on the other hand, computer skills are analyzed; in addition, the socio-economic context is emphasized

[1] Approved by the Government Council on June 1, 2012 and modified by the Government Council on February 6, 2015, by the Government Council on April 24, 2015, by the Government Council on July 16, 2015, and by the Governing Council of December 11, 2015, additionally modified by the Steering Committee of the Doctoral School September 15, 2017, Doctorate Commission September 20, 2017; approved by the Government Council of October 6, 2017

in relation to "Smart Cities". The corresponding articles are those collected as publications 1 and 2 in the doctoral dissertation, whose references are:

> PUBLICATION 1[2]: "A new educational pattern in response to new technologies and sustainable development. Enlightening ICT skills for youth employability in the European Union" (DOI http://dx.doi.org/10.1016/j.tele.2017.09.014), which has been published in 2018, in number 35 (4), pages 1031-1038, of the journal Telematics and Informatics (indexed in JCR), and

> PUBLICATION 2[3]: "Smart Cities for wellbeing: Youth employment and their skills on computers" (DOI https://doi.org/10.1108/JSTPM-04-2017-0014), which has been published in 2018, in number 9(2), pages 227-241 of the Journal of Science and Technology Policy Management (Indexed in the SJR/Scopus),

In this fourth chapter, through the indicated publications, the analysis of youth unemployment is framed in relation to what happened in recent years around the irruption of the wave of technological change, which is known as the Fourth Industrial Revolution (concept coined by Klaus Schwab, founder of the World Economic Forum), whose impact is difficult to predict and reveals that these future changes will affect different people unequally (ILO, 2017). Information and communication technologies (ICT) are a key part of this revolution, which, together with the economic crisis that began in the financial sector in August 2007, created a space with specific characteristics and special difficulties that have affected different countries and different groups of workers in a non-homogeneous way. For this reason, some authors have made substantial contributions to the study of the labor market and its relationship with the economic crisis, which have been called "the

[2] Picatoste, J., Pérez-Ortiz, L., & Ruesga-Benito, S. M. (2018). A new educational pattern in response to new technologies and sustainable development. Enlightening ICT skills for youth employability in the European Union. *Telematics and Informatics*, *35*(4), 1031-1038. http://dx.doi.org/10.1016/j.tele.2017.09.014

[3] Picatoste, J., Pérez-Ortiz, L., Ruesga-Benito, S. M., & Novo-Corti, I. (2018). Smart cities for wellbeing: youth employment and their skills on computers. *Journal of Science and Technology Policy Management*, *9*(2), 227-241. https://doi.org/10.1108/JSTPM-04-2017-0014

employment shock and the Great Recession 2.0", using this name to establish differences with the "Great Depression" of the 20-30 years of the last century (Ruesga-Benito, 2014).

In addition to considering the relevance of the technological environment, youth unemployment must be analyzed in the context of the transition from the educational environment to the labor market. Transitions depend on personal resources and specific individual characteristics, but, in addition, they are influenced by the institutional context, in particular, by the structure of the educational system, the organization of the employment system and the links between these institutions (Saar, Unt, and Kogan, 2008). The importance of the transition process is key, and some authors consider that youth unemployment is more related to this process than to the macroeconomic conditions of a country (Refrigeri and Aleandri, 2013). In general, young people who are looking for their first job are required to have an educational level that they must accredit; but, at the same time, in many occasions, work experience is demanded, which they mostly lack. In this way, they enter a vicious circle in which they are hindered by the opportunity to acquire experience and, consequently, access to employment (Weller, 2007). On the other hand, apart from the fact that this experience is difficult to achieve, it is usually irregular and without long-term career prospects. However, getting experience is very important, even crucial, to achieve employment, mainly due to three reasons: first, it allows young people to increase their level of human capital through experience; which, in the second place, reduces the risk of falling into long-term unemployment, on the one hand, and, on the other, reduces the risk of low-quality training; finally, in the third place, it prevents the appearance of discouragement due to lack of activity, which could lead them to swell the group of NEETs (young people who "neither study nor work") (Refrigeri and Aleandri, 2013).

Thus, it has been found that the way of addressing the issue of youth unemployment in Europe and the possible proposals for action must be different from those recommended and put into practice for the less developed countries. The impact of technology not only configures a new scenario, but it is also possible that it modifies the interaction between education and work, affecting the transition that young people must necessarily face. In this way, one of the consequences could be the reduction of the time during when the workers can use their knowledge and skills and, consequently, the new business models will bring with them continuous modifications in the competences. The importance of continuous education, in any of its types (formal and informal), will act as an attenuator of the risk of

losing employment as a consequence of the digitization process, and it is foreseeable that it will increase in the future (WEF 2016).

In sum, the publications that make up the fourth chapter analyze the aspects related to education and ICT, as being essential to explaining youth unemployment.

Chapter 5 is a full copy of the article entitled "Sustainable Development, Poverty and Risk of Exclusion for Young People in the European Union: The Case of NEETs", which corresponds to the third contribution. It focuses on the study of discouragement in which young people can fall when facing youth unemployment, by means of analyzing the causal relationship between the socioeconomic environment and the NEETs. This relationship is studied taking into account that both the economic and social environment can be considered explanatory variables of the extent of the problem of the NEETs and the unequal incidence of each of them is verified. In the text of the dissertation, it appears as publication 3 and its reference is:

> PUBLICATION 3[4]: "Sustainable development, poverty and risk of exclusion for Young people in the European Union: the case of NEETs" (DOI https://doi.org/10.3390/su10124708), published in 2018, in number 10(12), 4708, pages 1-15, of the journal Sustainability (indexed in the JCR).

This article emphasizes the importance of a detailed understanding of what is considered as youth unemployment. Our contribution goes beyond the concept and focuses on that which is essential for the adequate design of successful public policies. In this sense, it is fundamental to consider youth unemployment along with the problems related to it, as pointed out by Singell and Lillydahl (1989). In particular, there is a relatively large number of young people outside the education system and the labor market, not participating in the investment of human capital or in activities described as socially useful by society. In principle, these young people would not be "unemployed" because they do not seem to be

[4] Ruesga-Benito, S., González-Laxe, F., & Picatoste, X. (2018). Sustainable Development, Poverty, and Risk of Exclusion for Young People in the European Union: The Case of NEETs. *Sustainability*, *10*(12), 4708. https://doi.org/10.3390/su10124708

interested in employment, nor actively seek it (the NEETs), but constitute a fact worthy of attention that is not included in any statistical data (Cvecic and Sokolic, 2018).

In this way, the characteristics of the economic and social environment in the NEET phenomenon are the focus of attention in this publication.

Chapter 6 is a full copy of the article entitled "Wellbeing at Work: Self-Perception of Workers from a Gender Perspective", which is the fourth contribution. In this work, the study of vulnerable groups is analyzed, taking gender as an important factor in employment, and studying the case of the perceptions of employed people about their own work welfare, in relation to the application of a public policy of support for vulnerable groups and from a gender perspective. The self-assessment of work well-being and its influence on general well-being have been explained by a causality analysis. Its reference is:

> PUBLICATION 4[5]: "Wellbeing at work: self- perception of workers from a gender perspective", published on 2017, number 3/2017, Vol. 51, pages 161-181 on Computation and Economic Cybernetics Studies and Research (indexed in the JCR).

Bearing in mind that youth unemployment requires specific analysis, the need to design specific policies to address it is considered, since in addition to the qualitative importance of the topic raised in this work, its quantification reinforces this relevance. The probability that young people will be unemployed is three times greater than that of adults, in an environment whose main differential characteristics are linked to the instability and structural problems that it presents. On the other hand, the low quality of work is a key factor that accompanies the problem of unemployment (ILO, 2017), which becomes worse when it refers to the specific group of young people, increasing its size, because its own nature links it to the future evolution of the economy (Arrazola Vacas et al., 2018). In this area, the problem transcends individuals and becomes part of the socio-economic ideology

[5] Novo-Corti, I; López-Arranz, A.; González-Laxe, F & Picatoste, J. (2017). Wellbeing at work: self-perception of workers from a gender perspective. *Computation and Economic Cybernetics Studies and Research 3(51),* pp. 161-181.

of the community in which it is posed; therefore, fluctuations in youth unemployment influence balanced and sustainable development, as well as social welfare.

In this way, high youth unemployment rates imply a waste of resources and cause the deceleration of the long-term growth potential of an economy, from which lower income is derived, and, therefore, lower aggregate demand and GDP growth rates, as well as higher unemployment rates. (Gontkovičová, Mihalčová, and Pružinský, 2015), which would lead to a vicious circle difficult to break. The consequences produced in the long term by youth unemployment have been widely assumed in various academic studies, which have highlighted its important effects in different areas such as the lack of opportunities for accumulation of economic capital to build an independent life (Backeberg, Etling, and Tholen, 2018; Bell and Blanchflower, 2011).

In the context of the European Union, the countries of the south have been the most affected by the economic crisis and with the most deteriorated labor market. On the other hand, young people and women were the most damaged segments. In particular, the first of these groups is especially important because it affects people entering the labor market for their first time. About the second, Singell and Lillydahl (1989) state that there is a percentage of young women who are not counted as a part of "youth unemployment", since they have moved away, at least temporarily, from the labor market as a result of maternity, but this should be taken into account. Thus, the fight against youth unemployment is one of the main objectives for managers of public policies, aware that intervention through them can be decisive both in achieving labor insertion and increasing welfare levels in employment and satisfaction of society, especially with adverse circumstances in the economic environment.

Therefore, the publication presented as the sixth chapter analyses the effects of a policy directed at a vulnerable group on welfare at work and general well-being.

In general, the framework of analysis of youth unemployment in the European Union requires the study of the technological environment and access to the use and knowledge of ICT, the social and economic aspects and the role of public policies to improve workers' wellbeing.

The main objective of this dissertation is to analyze the main determinants of youth unemployment, in order to identify the key aspects relevant to the design of effective public

policies to address this problem, particularly in the context of the European Union. On the other hand, regarding methodology, the variables used in all the publications that make up this dissertation have common characteristics, the fact that they cannot be directly observed being the most prominent. This suggests that factor analysis should be used in order to construct the variables of these characteristics (Bentler, 1980). This is due to the fact that concepts related to youth employment gather the complexity shown in previous paragraphs and can hardly be synthesized by means of a single variable or indicator. That is why it is necessary to create or build these most complex indicators, which we have called "latent variables" (also known as "constructs"). Additionally, the reasons or explanatory causes of these variables have been sought, which is why an analysis of causality has been required. Thus, taking into account that causal relationships are sought, regression analysis is adequate to address them and has been chosen for these works. The combination of these methodologies can be found in the Models of Structural Equations (SEM), which have revealed their suitability for this type of analysis (Wright, 1934, Wright, 1960, Jöreskog, K. G., and Sörbom, D., 1982). In this way, the methodological coherence between the presented articles is clear, since the SEM have constituted a common methodological body for the set of the presented essays, although, in each of them, it is complemented with other types of methodologies, such as analysis of comparison of means, in cases where it is relevant. Regarding the sources of the data used, both secondary data, provided by the statistical office of the European Union, and collection of primary data, gathered through surveys conducted "ad hoc" for this work, have been used for this research.

Approaches to the study of youth unemployment are framed in the general context of the labor market. The problem of unemployment is a matter of social concern, which has been reflected in several academic papers (Dhakal, Connell & Burgess, 2018, Rowley & Feather, 1987). Both demand and supply of labor are made up of heterogeneous agents. Specifically, the business structure configures a very diverse demand, while, on the supply side, the profiles of job seekers are also very different. Young people constitute a specific group with special characteristics because they are in a period of transition from the educational to the work environment; in addition, they have ICT skills, as befits their generation. There are conceptual differences between youth unemployment and general unemployment, the most notable of which is related to the impact that youth unemployment has on economic growth and productivity (Grinevica & Rivza, 2017). The International Labor Organization (ILO), notes a specific difference between the challenge of youth employment and the

challenge of employment in general, ILO (2012) notes a specific difference between the challenge of youth employment and the challenge of employment in general, in that helping young people to have a good start helps to favor the trajectories on the path of decent work.

In general terms, it is important to achieve visibility of the multiple factors related to youth employment and the consequent complexity of their analysis (Ruesga Benito et al, 2014), due to the interrelation between them and their different dimensions. To this, it should be added that, generally, young people's access to the labor market is usually through low-quality jobs. This is due, in part and in certain countries, to the fact that they often start working in the informal economy (ILO, 2017). On the other hand, access to better paid jobs is restricted to certain types of workers, regardless of the level of their qualification, based on the existence of situations of discrimination and segmentation in the labor market, among other factors (Ruesga Benito, da Silva Bichara, and Monsueto, 2014a).

The identification of determining factors of youth unemployment can be analyzed from the perspective of human capital (knowledge, skills and individual skills susceptible to apply for production) and each one's social capital (means that some people have as a consequence of their social networks) as well as their personal capital (characteristics that affect motivation and ability to work). Therefore, personal and family characteristics are closely related to unemployment during the transition from adolescence to adulthood and influence the results of access to the labor market for years before young people become a part of the labor force (Caspi, Wright, Moffitt, and Silva, 1998). In this sense, the incorporation of economic, sociological and psychological perspectives provide complementary approaches to each other (Caspi et al., 1998) that help analyze the complexity of young people's access to the labor market and configure a multidisciplinary interpretation of the various unemployment risk factors. It follows that vulnerability not only comes from the lack of skills, but a set of psychosocial and family characteristics present from the early stages of life and that influence the transition from school to work. This influence can sometimes be negative, affecting the risk of later finding themselves in unemployment, when they come from an environment with insufficient human capital, broken or vulnerable social ties and aversive styles of behavior. In this sense, applied to the case of university students in Spain, it has been proven that the socioeconomic and personal characteristics of university students are fundamental to understanding the entry into the

labor market during their period of academic training (Ruesga Benito, da Silva Bichara, and Monsueto, 2014b).

Social capital, as well as human and personal capital, enrich the individual and endow him with capacities that favor his integral development. These skills are felt in all areas of life, including work; for this reason, having a generous social capital facilitates both the transition and permanence in the labor market.

In the field of capabilities, a specific aspect is the role of social networks in youths' labor insertion, recently studied by various authors who proved its great influence on employability, which makes it a structural characteristic of the labor market for this group (Vacchiano, Martí, Yepes, and Miquel, 2018). In addition, the relationship between participation in digital social networks, access to communication networks (both technical and to the devices or equipment) and skills and abilities in their management (hardware and software) has been highlighted. In this sense, the environment of cities in general and Smart Cities in particular is favorable to involvement in these networks.

The work contacts of young people are often limited and are greatly reduced compared to those of their parents. This limits their access to information about available jobs. In this sense, friendship networks are also an important aspect to consider, because if friends' networks are mostly unemployed, the risk of falling into that problem increases, in the same way, that, in the opposite direction, it is foreseeable that good social relations and solid contacts will facilitate access to employment (Hällsten, Edling, and Rydgren, 2017). Vacchiano, Martí, Yepes, and Miquel (2018) have proved the importance of personal networks for employability (among 250 young people in Barcelona’s metropolitan area), as it was pointed out, it is a structural characteristic of the young people's job market.

As a summary, the contents of this dissertation are structured around three fundamental aspects to explain the problem of youth unemployment within the framework of the European Union.

First of all, the problem is contextualized within the framework of the importance of new technologies for young people to find work. For EUROSTAT the group of young people at working age are those aged between 16 and 24 years (in some cases this age is extended to 29 years). This being the statistical office of the European Union, the empirical analyses carried out here are, in general, adjusted to the ages selected by said statistical source.

Secondly, the phenomenon that is known as "NEETs" is studied, focusing the problem on the influence of the social and economic environment on the discouragement of the youth population in the context of the European Union. Finally, vulnerable groups and gender perspective are incorporated, through the study of the impact on labor and general welfare of policies designed to support specific groups of workers, through the analysis of a case, based on the Law of Equality promoted in Spain, which has been a pioneer.

In this way, our original contribution is synthesized in the four research works, already published at the time of presenting the dissertation. Each of these contributions constitutes a novel contribution on the key factors explaining youth unemployment. Three of these publications specifically analyze the points identified as essential: knowledge, education and skills in ICT, the situation of discouragement and the phenomenon of NEETs and the perspective of vulnerable groups in relation to work and general welfare. A fourth article contextualizes youth unemployment within the framework of Smart Cities, to complete the analysis related to the impact of the new technological revolution. Given the applied aspect of all these publications, they have been contextualized within the framework of the European Union as a reference space.

The originality of the papers presented and their thematic coherence has allowed achieving results that, as a synthesis, confirm the importance of knowledge and skills in ICT for the employability of young people, as well as the adaptation to urban spaces created by Smart Cities. Likewise, the influence of the socioeconomic environment has been shown to be decisive in preventing discouragement from taking hold among youth, leading to them forming part of the NEETs group. Finally, the effectiveness of public policies in supporting vulnerable groups has proved relevant not only for the increase in labor welfare but also for the general welfare of society.

Additionally, the influence of public policies aimed at vulnerable groups on both labor and general welfare has been confirmed. Overall, it could be said that the main contribution of the author of these works consists of an analysis applied in the European context of the main axes on which the basic reasons or causal elements of youth unemployment pivot.

As a result of these studies, some of the main explanatory causes of youth unemployment have been identified, and some economic policy suggestions have been offered for the consideration of public policy managers, with the aim that these academic investigations can be useful for our whole society.

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INTRODUCCIÓN

1. Introducción (Introduction in Spanish)

Al amparo del artículo octavo del Procedimiento relativo al tribunal, defensa y evaluación de la tesis doctoral en la Universidad Autónoma de Madrid[6] ("Tesis presentadas como un compendio de publicaciones"), se presenta la tesis "Youth unemployment in the context of the European Union (Desempleo juvenil en el contexto de la Unión Europea)", que incluye cuatro artículos, tres de los cuales han sido publicados en revistas indexadas en el Journal Citation Reports (JCR) y uno en el Scimago Journal Citation Reports (SJR/Scopus). Todas ellas se han realizado durante el período de tutela del programa de doctorado y han sido publicadas en fecha posterior a la matriculación en los estudios de doctorado (artículo 8.1), del mencionado procedimiento.

La tesis doctoral está compuesta de siete capítulos. Se comienza por una introducción general (Capítulo 1), en la que se presentan los trabajos compendiados, se justifica la temática y se explica la aportación original del autor, de acuerdo con la normativa (artículo 8.2.a). Asimismo, se señala el vínculo existente entre las publicaciones, tanto en los aspectos temáticos y metodológicos. En el Capítulo 2 se detallan los objetivos generales y la metodología aplicada en los trabajos presentados, mientras que en Capítulo 3 se presenta una aproximación teórica y empírica al problema del desempleo juvenil en el contexto de la Unión Europea.

El Capítulo 4, titulado "Educación, tecnología y empleo juvenil", analiza características específicas del empleo juvenil en términos generales y más específicamente en los aspectos relacionados con las Tecnologías de la Información y la Comunicación (TIC), tanto desde la influencia a nivel individual como en lo relativo a los entornos social y económico en el que los jóvenes desarrollan su actividad. Así, en este capítulo se incluye la copia íntegra de dos publicaciones que estudian los temas señalados, que se identifican con las dos primeras contribuciones y que se refieren a la influencia de las TIC en el empleo juvenil, analizado desde dos aspectos complementarios. Por una parte, se analiza la importancia de que los jóvenes dispongan de formación en TIC como factor determinante para acceder al empleo

[6] Aprobado por Consejo de Gobierno de 1 de junio de 2012 y modificado por Consejo de Gobierno de 6 de febrero de 2015, por Consejo de Gobierno de 24 de abril de 2015, por Consejo de Gobierno de 16 de julio de 2015, y por Consejo de Gobierno de 11 de diciembre de 2015, adicionalmente modificado por Comité de Dirección de la Escuela de Doctorado 15 de septiembre de 2017, Comisión de Doctorado 20 de septiembre de 2017; aprobado por Consejo de Gobierno de 6 de octubre de 2017

y a las habilidades con computadoras, y, por otra, se enfatiza en el contexto socioeconómico en relación con las "Smart Cities". Los artículos correspondientes son los recogidos como publicaciones 1 y 2 en la Tesis Doctoral, cuyas referencias son:

> PUBLICACIÓN 1[7]: "A new educational pattern in response to new technologies and sustainable development. Enlightening ICT skills for youth employability in the European Union" (con identificador digital, DOI http://dx.doi.org/10.1016/j.tele.2017.09.014), que ha sido publicado en el año 2018, en el número 35(4), páginas 1031-1038, de la revista Telematics and Informatics (indexada en JCR), y

> PUBLICACIÓN 2[8]: "Smart Cities for wellbeing: Youth employment and their skills on computers" (con identificador digital DOI https://doi.org/10.1108/JSTPM-04-2017-0014), que ha sido publicado en el año 2018, en el número 9(2), páginas 227-241 del Journal of Science and Technology Policy Management (indexada en el SJR/Scopus),

En este capítulo cuarto, a través de las publicaciones indicadas, se enmarca el análisis del desempleo juvenil en relación con lo sucedido en los últimos años en torno a la irrupción de la ola de cambio tecnológico, que se conoce como Cuarta Revolución Industrial (concepto acuñado por Klaus Schwab, fundador del Foro Económico Mundial), cuyo impacto es difícil de predecir y pone al descubierto que estos cambios futuros afectarán a diferentes personas de forma desigual (OIT, 2017). Las tecnologías de la información y la comunicación (TIC) son una pieza clave de esta revolución que, conjuntamente con la crisis económica que se inició en el sector financiero en agosto de 2007, configuraron un espacio con características específicas y dificultades especiales que han afectaron de manera no

[7] Picatoste, J., Pérez-Ortiz, L., & Ruesga-Benito, S. M. (2018). A new educational pattern in response to new technologies and sustainable development. Enlightening ICT skills for youth employability in the European Union. *Telematics and Informatics*, *35*(4), 1031-1038. http://dx.doi.org/10.1016/j.tele.2017.09.014

[8] Picatoste, J., Pérez-Ortiz, L., Ruesga-Benito, S. M., & Novo-Corti, I. (2018). Smart cities for wellbeing: youth employment and their skills on computers. *Journal of Science and Technology Policy Management*, *9*(2), 227-241. https://doi.org/10.1108/JSTPM-04-2017-0014

homogénea a distintos países y diferentes grupos de trabajadores. Por este motivo, algunos autores han realizado sustanciales aportaciones al estudio del mercado de trabajo y su relación con el entorno económico de crisis, que han denominado "el shock de empleo y la Gran Recesión 2.0", utilizando este apelativo para establecer diferencias con la "Gran Depresión" de los años 20-30 del siglo pasado (Ruesga-Benito, 2014).

Además del considerar la relevancia del entorno tecnológico, el desempleo juvenil debe ser analizado en el contexto de la transición del entorno educativo al mercado laboral. Las transiciones dependen de los recursos personales y de las características individuales específicas, pero, adicionalmente, están influenciadas por el contexto institucional, en concreto, por la estructura del sistema educativo, la organización del sistema de empleo y los vínculos entre esas instituciones (Saar, Unt, y Kogan, 2008). La importancia del proceso de transición es clave, y algunos autores consideran que el desempleo juvenil está más relacionado con este proceso que con las condiciones macroeconómicas de un país (Refrigeri y Aleandri, 2013). En general, a los jóvenes que se encuentran buscando su primer empleo se les exige un nivel educativo que deben acreditar; pero, al mismo tiempo, en muchas ocasiones, se les demanda experiencia laboral, de la cual mayoritariamente carecen. De este modo, se entra en un círculo vicioso en el que se les obstaculiza la oportunidad de adquirir la experiencia y, consecuentemente, el acceso al empleo (Weller, 2007). Por otra parte, además de que esta experiencia es difícil de conseguir, suele ser de tipo irregular y sin perspectivas de carrera a largo plazo. No obstante, conseguirla es muy importante, incluso crucial, para lograr un empleo, debido fundamentalmente a tres razones: en primer lugar, permite a los jóvenes aumentar su nivel de capital humano a través de la experiencia; lo que, en segundo lugar, reduce el riesgo de caer en el desempleo a largo plazo, por una parte, y, por otra, aminora el riesgo de una capacitación de baja calidad; finalmente, en tercer lugar, previene la aparición del desánimo debido a la falta de actividad, lo que les podría llevarles a engrosar el grupo de NINIs (jóvenes que "ni estudian ni trabajan") (Refrigeri y Aleandri, 2013).

Así, se ha constatado que el modo de abordar la cuestión del desempleo juvenil en Europa y las posibles propuestas de actuación deben ser diferentes de las aconsejadas y puestas en práctica para países menos desarrollados. El impacto de la tecnología, no sólo configura un nuevo escenario, sino que también es posible que modifique la interacción entre educación y trabajo, afectando a la transición que necesariamente los jóvenes deben afrontar. De este

modo, una de las consecuencias podría ser la reducción del tiempo durante el cual los trabajadores puedan utilizar sus conocimientos y sus destrezas y, consiguientemente, los nuevos modelos de negocio traerán consigo continuas modificaciones en las competencias. La importancia de la formación continuada, en cualquiera de sus tipos (formal e informal) actuará como un atenuante del riesgo de perder el empleo como consecuencia del proceso de digitalización, y es previsible que esta aumente en el futuro (WEF 2016).

En suma, las publicaciones que conforman el capítulo cuarto analizan los aspectos relativos a la educación y a las TIC, como esenciales para explicar el desempleo juvenil.

El Capítulo 5 es una copia íntegra del artículo titulado "Sustainable development, poverty and risk of exclusion for young people in the European Union: the case of NEETs", que se corresponde con la tercera aportación; y que se centra en el estudio del desánimo en el que pueden caer los jóvenes ante el desempleo juvenil, mediante el análisis de la relación causal entre el entorno socioeconómico y los NINIs. Esta relación se estudia teniendo en cuenta que tanto el entorno económico como el social pueden ser consideradas variables explicativas de la extensión del problema de los NINIs y se comprueba la desigual incidencia de cada una de ellas. En el texto de la Tesis Doctoral figura como publicación 3 y su referencia es:

> PUBLICACIÓN 3[9]: "Sustainable development, poverty and risk of exclusion for Young people in the European Union: the case of NEETs", con identificador digital DOI https://doi.org/10.3390/su10124708, publicado en 2018 en el número 10(12), 4708 de la revista Sustainability (indexada en el JCR).

En este artículo se enfatiza la importancia de conocer en detalle lo que se considera desempleo juvenil. Nuestra contribución va más allá del concepto y se centra en lo esencial para el diseño adecuado de políticas públicas exitosas. En este sentido, es fundamental

[9] Ruesga-Benito, S., González-Laxe, F., & Picatoste, X. (2018). Sustainable Development, Poverty, and Risk of Exclusion for Young People in the European Union: The Case of NEETs. *Sustainability*, *10*(12), 4708. https://doi.org/10.3390/su10124708

considerar el desempleo juvenil conjuntamente con los problemas vinculados al mismo, tal como han señalado Singell y Lillydahl (1989). En concreto, que existe un número relativamente grande de jóvenes que están fuera del sistema educativo y fuera del mercado de trabajo, no participando en la inversión de capital humano o en actividades que la sociedad describiría como socialmente útiles. En principio, estos jóvenes no serían "desempleados" porque no parecen estar interesados en el empleo, ni lo buscan de manera activa (los NINIs), pero que, sin embargo, constituyen un hecho merecedor de atención que no queda recogido en ningún dato estadístico (Cvecic y Sokolic, 2018).

De este modo, las características del entorno económico y social en el fenómeno NINI centran la atención de esta publicación.

El Capítulo 6 es una copia íntegra del artículo titulado "Wellbeing at work: self-perception of workers from a gender perspective", que constituye la cuarta aportación. En este trabajo, se analiza el estudio de grupos vulnerables, tomando el género como factor importante en el empleo y se estudia el caso de las percepciones de las personas empleadas sobre su propio bienestar laboral, en relación con la aplicación de una política pública de apoyo a grupos vulnerables y la perspectiva de género. La auto-valoración del bienestar laboral y de la influencia del mismo en el bienestar en general se han explicado mediante un análisis de causalidad. Su referencia es:

> PUBLICACIÓN 4[10]: "Wellbeing at work: self- perception of workers from a gender perspective", y está publicado en el año 2017, en el número 3/2017, Vol. 51, páginas 161-181 de la revista Computation and Economic Cybernetics Studies and Research (indexada en el JCR).

Teniendo en cuenta que el desempleo juvenil requiere de análisis específicos, se plantea la necesidad de diseñar políticas específicas para tratarlo, ya que además de la importancia cualitativa del tema planteado en este trabajo, la cuantificación del mismo refuerza dicha

[10] Novo-Corti, I; López-Arranz, A.; González-Laxe, F & Picatoste, J. (2017). Wellbeing at work: self-perception of workers from a gender perspective. *Computation and Economic Cybernetics Studies and Research 3(51),* pp. 161-181.

relevancia. La probabilidad de que los jóvenes estén en situación de desempleo es tres veces mayor que la de los adultos, en un entorno cuyas principales características diferenciales están vinculadas a la inestabilidad y a los problemas estructurales que presenta. Por otra parte, la escasa calidad del trabajo es un factor clave que acompaña al problema del desempleo (OIT, 2017), que se agrava cuando se refiere al grupo específico de los jóvenes, aumentando su dimensión, porque su propia naturaleza le vincula a la evolución futura de la economía (Arrazola Vacas et al., 2018). En este ámbito, el problema trasciende a los individuos y pasa a formar parte del ideario socio-económico de la comunidad en la que se plantea; por eso, las fluctuaciones en el desempleo juvenil influyen sobre el desarrollo equilibrado y sostenible, así como sobre el bienestar social.

De esta forma, tasas elevadas de desempleo juvenil implican un despilfarro de recursos y provocan la desaceleración del potencial de crecimiento a largo plazo de una economía, de lo que se derivan menores ingresos, y, por lo tanto, una menor demanda agregada y tasas de crecimiento del PIB (Gontkovičová, Mihalčová, y Pružinský, 2015), con lo que se entraría en un círculo vicioso difícil de romper. Las consecuencias producidas en el largo plazo por el desempleo juvenil se han asumido ampliamente en distintos estudios académicos, que han destacado sus importantes efectos en distintos ámbitos como la ausencia de oportunidades de acumulación de capital económico para construir una vida independiente (Backeberg, Etling, y Tholen, 2018; Bell y Blanchflower, 2011).

En el contexto de la Unión Europea, han sido los países del sur los más afectados por la crisis económica y los que han visto más deteriorado el mercado de trabajo. Por otra parte, los jóvenes y las mujeres fueron los segmentos más dañados. En concreto, el primero de estos colectivos tiene especial importancia porque afecta a personas que se incorporan por primera vez al mercado de trabajo, mientras que respecto al segundo Singell y Lillydahl (1989) afirman existe un porcentaje de mujeres jóvenes que no se contabilizan como parte del "desempleo juvenil" ya que se han apartado, al menos temporalmente, del mercado de trabajo como consecuencia de la maternidad y que debe ser tenido en cuenta. Así, la lucha contra el desempleo juvenil se configura uno de los principales objetivos de los gestores de las políticas públicas, conscientes de que la intervención a través de las mismas puede resultar determinante tanto para conseguir la inserción laboral como para aumentar los niveles de bienestar en el empleo y de satisfacción de la sociedad, especialmente en circunstancias adversas en el entorno económico.

Por tanto, la publicación presentada como capítulo sexto analiza los efectos de una política dirigida e un grupo vulnerable sobre el bienestar en el trabajo y el bienestar en general.

En términos generales, el marco de análisis del desempleo juvenil en la Unión Europea, precisa del estudio del entorno tecnológico y del acceso al uso y conocimiento de las TIC, de los aspectos sociales y económicos existentes y del papel de las políticas públicas para mejorar el bienestar de los trabajadores.

El objetivo principal de esta tesis doctoral consiste en analizar los principales factores determinantes del desempleo juvenil, de modo que permitan identificar los aspectos clave relevantes para el diseño de políticas públicas efectivas para afrontar este problema, particularmente en el contexto de la Unión Europea. Por otra parte, en lo relativo a la metodología, las variables utilizadas en todas las publicaciones que conforman esta tesis doctoral presentan características comunes, de las cuales, la más destacada es que no se pueden observar directamente, lo que ha sugerido la conveniencia de aplicar el análisis factorial para poder construirlas (Bentler, 1980). Esto es así debido a que los conceptos relacionados con el empleo juvenil asumen la complejidad puesta de manifiesto en párrafos anteriores y difícilmente pueden ser sintetizados mediante una única variable o indicador. Es por ello que se precisa crear o construir esos indicadores más complejos, que hemos denominado variables latentes (también conocidas como “constructos”). Adicionalmente, se han buscado las razones o causas explicativas de dichas variables, por lo que se ha precisado de un análisis de causalidad. Así, teniendo en cuenta que se buscan relaciones causales, el análisis de regresión es el adecuado para abordarlas y ha sido el elegido para estos trabajos. La combinación de estas metodologías se puede encontrar en los Modelos de Ecuaciones Estructurales (SEM), que han revelado su idoneidad para este tipo de análisis (Wright, 1934; Wright; 1960; Jöreskog, K. G., and Sörbom, D.,1982). De este modo, la coherencia metodológica entre los artículos presentados queda patente, puesto que los SEM han constituido un cuerpo metodológico común para el conjunto de los ensayos presentados, si bien, en cada uno de ellos, se complementa con otros tipos de metodologías, como análisis de comparación de medias, en los casos en que es pertinente. En cuanto a las fuentes de los datos que se han utilizado, se ha recurrido tanto a datos secundarios, proporcionados por la oficina estadística de la Unión Europea, como a la obtención de datos primarios, recogidos mediante encuestas realizadas “ad hoc” para este trabajo de investigación.

Las aproximaciones al estudio del desempleo juvenil se enmarcan en el contexto general del mercado de trabajo. El problema del desempleo es objeto de preocupación social, lo que se ha reflejado en varios trabajos académicos (Dhakal, Connell & Burgess, 2018; Rowley y Feather, 1987). Tanto la demanda como la oferta de trabajo están compuestas por agentes heterogéneos. En concreto, la estructura empresarial configura una demanda muy diversa, mientras que, por el lado de la oferta, los perfiles de quienes buscan trabajo son también muy diferentes. Los jóvenes constituyen un grupo específico con características especiales debido a que se encuentran en un período de transición del ámbito educativo al laboral; además, tienen habilidades con las TIC, tal como corresponde con su generación. Existen diferencias conceptuales entre el desempleo juvenil y el desempleo general, la más destacable de las cuales está relacionada con el impacto que el desempleo juvenil tiene sobre el crecimiento económico y la productividad (Grinevica y Rivza, 2017). Por su parte, la Organización Internacional del trabajo (OIT), señala una diferencia específica entre el desafío del empleo juvenil y el desafío del empleo en general, consistente "en que ayudar a la juventud a tener un buen comienzo contribuye a favorecer que sus trayectorias laborales sigan la vía del trabajo decente" (OIT, 2012).

En términos generales, es importante lograr la visibilización de los múltiples factores relacionados con el empleo juvenil y la consiguiente la complejidad de su análisis (Ruesga Benito, Lasierra, Pérez Ortiz, Pérez Trujillo y Silva Bichara, 2014), debido a la interrelación entre los mismos y a las diferentes dimensiones en las que se encuentran. A esto hay que añadir que, generalmente, el acceso de los jóvenes al mercado de trabajo suele ser a través de empleos de escasa calidad. Esto se debe, en parte y en ciertos países, a que a menudo empiezan a trabajar en la economía informal (OIT, 2017). Por otra parte, el acceso a empleos mejor retribuidos se restringe a ciertas tipologías de trabajadores, independientemente del nivel de su cualificación en base a la existencia de situaciones de discriminación y de segmentación en el mercado laboral, entre otros factores (Ruesga Benito, da Silva Bichara, y Monsueto, 2014a).

La identificación de los factores determinantes del desempleo juvenil se puede analizar desde la perspectiva del capital humano (conocimientos, capacidades y habilidades individuales susceptibles de aplicar para la producción) y el capital social (medios que tienen algunas personas como consecuencia de sus redes sociales) de cada persona, así como sobre su capital personal (características que afectan a la motivación y a la capacidad

para trabajar). Por tanto, las características personales y familiares, están muy relacionadas con el desempleo durante la transición de la adolescencia a la edad adulta e influyen sobre los resultados en el acceso al mercado de trabajo desde años antes de que los jóvenes pasen a formar parte de la fuerza de trabajo (Caspi, Wright, Moffitt, y Silva, 1998). En este sentido, la incorporación de las perspectivas económicas, sociológicas y psicológicas aportan enfoques complementarios entre sí (Caspi et al., 1998) que ayudan a analizar la complejidad del acceso de los jóvenes al mercado de trabajo y configuran una interpretación multidisciplinar de los diversos factores de riesgo de desempleo. De ella se desprende que la vulnerabilidad no sólo procede de la carencia de habilidades, sino de un conjunto de características psicosociales y familiares presentes desde las fases iniciales de la vida y que influyen en la transición de la escuela al trabajo. Esta influencia, en ocasiones, puede ser negativa, incidiendo en el riesgo de encontrarse luego en desempleo, cuando se procede de un entorno con insuficiente capital humano, vínculos sociales rotos o vulnerables y estilos de conducta aversivos. En este sentido, aplicado al caso de los estudiantes universitarios en España, se ha comprobado que las características socioeconómicas y personales de los estudiantes universitarios son fundamentales para entender la entrada en el mercado de trabajo durante el periodo de formación académica (Ruesga Benito, da Silva Bichara, y Monsueto, 2014b).

El capital social, al igual que el capital humano y el personal, enriquecen al individuo y le dota de capacidades que favorecen su desarrollo integral. Estas capacidades se dejan sentir en todas las esferas de su vida, incluida la laboral; por eso, disponer de un capital social abundante facilita a la juventud tanto la transición al mercado de trabajo como la permanencia en el mismo.

En el terreno de las capacidades, un aspecto específico lo constituye el papel de las redes sociales en la inserción laboral de la juventud, el cual ha sido estudiado recientemente por diversos autores, comprobándose su gran influencia en la empleabilidad, lo que le convierte en una característica estructural del mercado de trabajo de este grupo (Vacchiano, Martí, Yepes, y Miquel, 2018). Además, se ha resaltado la relación entre la participación en las redes sociales digitales, el acceso a las redes de comunicación (tanto técnicas como a los dispositivos o equipos) y las habilidades y destrezas en su manejo (hardware y de software). En este sentido, el entorno de las ciudades en general y de las Smart Cities en particular es favorable a la implicación en estas redes.

Los contactos laborales de los jóvenes, en muchas ocasiones son limitados y se reducen en gran medida a los de sus padres, lo cual limita su acceso a la información sobre los empleos disponibles; en este sentido, las redes de amistades son también un aspecto importante a considerar, ya que si las redes de amigos se encuentran mayoritariamente en desempleo, el riesgo de caer en ese problema aumenta, de la misma manera, que, en el sentido opuesto, es previsible que unas buenas relaciones sociales y unos sólidos contactos facilitaran el acceso al empleo (Hällsten, Edling, y Rydgren, 2017). Vacchiano, Martí, Yepes, y Miquel (2018) han comprobado, en un estudio realizado en el área metropolitana de Barcelona, entre 250 jóvenes, la importancia de las redes personales para la empleabilidad, lo que se ha señalado como una característica estructural del mercado de trabajo de los jóvenes.

A modo de recapitulación, los contenidos de esta tesis doctoral, se estructuran en torno a tres aspectos fundamentales para explicar el problema del desempleo juvenil en el marco de la Unión Europea. En primer lugar, se contextualiza el problema en el marco de la importancia de las nuevas tecnologías a la hora de que los jóvenes encuentren trabajo. Para EUROSTAT, forman parte del grupo de jóvenes aquellas personas que están en edad de trabajar y que tienen entre 16 y 24 años (en algunas ocasiones se amplía esta edad hasta los 29 años). Siendo ésta la oficina estadística de la Unión Europea, los análisis empíricos aquí realizados, en general se ajustan a las edades recogidas por dicha fuente estadística. En segundo lugar, se estudia el fenómeno conocido como "NINIs", enfocando el problema en la influencia del entorno social y económico sobre el desánimo de la población juvenil en el contexto de la Unión Europea. Finalmente, se incorpora la perspectiva de grupos vulnerables y género, mediante el estudio del impacto en el bienestar laboral y el bienestar general de las políticas de apoyo a grupos de trabajadores específicos, mediante el análisis de un caso, basado en la Ley de Igualdad promovida en España, que ha sido pionera.

De este modo, nuestra aportación original se sintetiza en los cuatro trabajos de investigación, ya publicados en el momento de presentar la tesis doctoral. Cada una de estas aportaciones constituye una contribución novedosa sobre los factores claves para explicar el desempleo juvenil. Tres de estas publicaciones analizan específicamente los puntos señalados como esenciales: el conocimiento, la educación y las habilidades en TIC, la situación de desánimo y el fenómeno NINIs y la perspectiva de grupos vulnerables en relación con el bienestar laboral y general. Un cuarto artículo contextualiza el desempleo juvenil en el marco de las Smart Cities, para completar el análisis relacionado con el

impacto de la nueva revolución tecnológica. Dada la vertiente aplicada de todas estas publicaciones, se han contextualizado en el marco de la Unión Europea como espacio de referencia.

La originalidad de los trabajos presentados y su coherencia temática ha permitido lograr resultados que, como síntesis, confirman la importancia del conocimiento y destreza en TIC para la empleabilidad de los jóvenes, así como de la adaptación a los espacios urbanos, creados por las Smart Cities. Asimismo, la influencia del entorno socioeconómico se ha mostrado como determinante para evitar que el desánimo se afiance entre los jóvenes, llevándoles a formar parte del grupo de NINIs. Finalmente, la efectividad de las políticas públicas de apoyo a los colectivos vulnerables se ha mostrado relevante no sólo para el aumento del bienestar laboral, sino también para el bienestar general de la sociedad.

Las principales aportaciones de esta tesis doctoral son dos: por una parte, se ha probado que, en lo relativo a las TIC, la educación informal es más efectiva que la educación formal para lograr la empleabilidad y, por otra, se ha demostrado que el entorno socioeconómico constituye un aspecto clave para evitar el fenómeno NINI, más allá de la situación económica del país. Adicionalmente, se ha constatado la influencia de las políticas públicas dirigidas a grupos vulnerables en el bienestar tanto laboral como general. En conjunto, se podría afirmar que la aportación principal del autor de estos trabajos consiste en un análisis aplicado en el contexto europeo, de los principales ejes sobre los que pivotan las razones básicas o elementos causales del desempleo juvenil. Como resultado de estos estudios, se han podido identificar algunas de las principales causas explicativas del desempleo juvenil y así se han podido ofrecer ciertas sugerencias de política económica para la consideración de los gestores de políticas públicas, con el ánimo de que estas investigaciones académicas puedan ser de utilidad a la sociedad en su conjunto.

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OBJECTIVES AND METHOD

2. Objectives and Method

The main objective of this work is the study of youth unemployment in the context of the European Union. The characteristics of this type of unemployment require a precise and independent study of other cases within the framework of the labour market. For analysing its specific characteristics, the study has been focused on a geographical area and the selected one is the European Union due it interest and worldwide importance.

The complexity of the treated subject is shown in the multifactorial aspects that, sometimes, go beyond the concrete indicators, which can be measured by means of the information contained in the databases. This is the reason to work with variables of multidimensional nature, which are composed of several indicators that allow the "construction" of the appropriate variables. These are the so-called "latent variables or constructs" that are used throughout this investigation. Factorial analysis is required for its construction. The high potential of the proposed methodology for the study of causal relationships between unobservable variables has been widely recognized (Bentler, 1980). The aim is jointly applying the techniques of factorial analysis and linear regression, in the context of a specific theoretical framework. This is a confirmatory factor analysis, which allows the creation or construction of those variables that cannot be observed directly, mainly due to the multiplicity of factors that make them up, which are known, observable and quantifiable, that its set constitutes the so-called "latent variable or construct".

On the other hand, it is intended to find explanations through cause-effect relationships, for which linear regression analysis has traditionally been shown as adequate for explaining the causal relations among the latent variables. The combination of these two methodologies: factorial analysis and linear regression analysis, in the context of a predefined theoretical framework, can be approached in an ideal way by means of the Structural Equation Models (SEM), which have consisted of the main methodology used in this investigation.

The SEM models have been useful to address many substantive problems in the social and behavioral sciences. Currently, they are multiple knowledge areas, like sociology, psychology, education, economics and econometrics (Jöreskog and Sörbom, 1982). They have their origin in the models based on the "path analysis" proposed by Wrigth (1934, 1960) and later developed by Jöreskog (1967, 1973) and by Jöreskog and Sörbom (1982). SEM models consist essentially of analyzing the causality between one or several variables

(independent / or dependent), taking into account the existence of multiple interrelationships between them, which introduces causality. At the same time, the possibility of working simultaneously with observed and latent variables is established.

Other complementary methodologies have also been applied, such as the comparison of means analysis and the studies of homogeneity of variances by means of the Levene test, to verify the statistically significant differences between the specific groups that are analysed.

Data sources have been both secondary, through the Statistical Office of the European Union (EUROSTAT), as primary, through the collection of data through specific surveys and questionnaires elaborated for this research.

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OBJETIVOS Y MÉTODO

2. Objetivos y método (Objectives and Method in Spanish)

El principal objetivo de este trabajo consiste en el estudio del desempleo juvenil en el contexto de la Unión Europea. Las características propias de este tipo de desempleo requieren de un estudio específico e independiente de otras casuísticas dentro del marco del mercado de trabajo. Al objeto de centrar el objeto de estudio en un área geográfica concreta, que pueda permitir determinar ciertas características comunes, se ha seleccionado el entorno de la Unión Europea.

La complejidad del tema a tratar se muestra en aspectos multifactoriales que, en ocasiones van más allá de cifras e indicadores concretos, por tal motivo, se ha considerado la posibilidad de trabajar con variables más multidimensionales, compuestas de varios indicadores. Estas son las conocidas como "variables latentes o constructos" que se utilizan a lo largo de esta investigación. Para su construcción se precisa del análisis factorial. El alto potencial de la metodología propuesta para el estudio de las relaciones causales entre variables no observables ha sido ampliamente reconocido (Bentler, 1980). El objetivo es aplicar conjuntamente las técnicas de análisis factorial y de la regresión lineal, en el contexto de un marco teórico específico. Este es un análisis factorial confirmatorio, que permite la creación o construcción de aquellas variables que no se pueden observar directamente, principalmente debido a la multiplicidad de factores que las componen, que son conocidas, observables y cuantificables, y que de forma conjunta constituyen la llamada "Variable latente" o "constructo".

Por otra parte, se ha tratado de buscar explicaciones mediante relaciones de causa-efecto, para lo que el análisis de regresión lineal se ha mostrado tradicionalmente adecuado, aplicado a las variables latentes. La combinación de estas dos metodologías: análisis factorial y análisis de regresión lineal, en el contexto de un marco teórico predefinido, puede abordarse de manera ideal por medio de modelos de ecuaciones estructurales (SEM), que han consistido en la metodología principal utilizada en este investigación.

Los modelos SEM han sido útiles para abordar muchos problemas sustanciales en las ciencias sociales y del comportamiento. Actualmente, son áreas de ámbito multidisciplinar, como sociología, psicología, educación, economía y econometría (Jöreskog y Sörbom, 1982) las que más utilizan esta metodología. Tienen su origen en los modelos basados en

el "análisis de camino" propuesto por Wright (1934, 1960) y más tarde desarrollado por Jöreskog (1967, 1973) y por Jöreskog y Sörbom (1982). Los modelos SEM consisten esencialmente en analizar la causalidad entre una o varias variables (independientes / dependientes), teniendo en cuenta la existencia de múltiples interrelaciones entre ellas, lo que introduce la causalidad. Al mismo tiempo, se establece la posibilidad de trabajar simultáneamente con variables observadas y latentes.

Se han utilizado otras metodologías complementarias, como el análisis de comparación de medias y los estudios de homogeneidad de varianzas mediante el test de Levene, para buscar diferencias estadísticamente significativas entre determinados grupos específicos.

Las fuentes de los datos han sido tanto secundarias, mediante información de la Oficina Estadística de la Unión Europea (EUROSTAT), como primarias, mediante datos recogidos a través de encuestas y cuestionarios diseñados específicamente para la investigación.

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THEORETICAL AND EMPIRICAL APPROACH TO YOUTH UNEMPLOYMENT

3. Theoretical and empirical approach to youth unemployment

3.1.Introduction

Youth unemployment is a problem of economic and social nature, whose consequences go beyond the world of work and affect the lives of those who suffer it, and may give rise to processes of deprivation, poverty or social exclusion, among other social problems (de-la-Hoz-Aguilar, Quejada-Perez, & Yanez-Contreras, 2013). Youth unemployment has specific characteristics that justify its special conditions and explain why its rates are higher than those for other social groups. It is conceptualized as youth unemployment those corresponding to people 15-24 years aged (according to Eurostat). General unemployment is studied for those of working age (belonging to the active population) who have lost their jobs and are looking for employment. However, the differences are not exclusively in age. The typology and characteristics of both types of unemployment go further and show the complexity corresponding to their social and economic environment. The economic dynamism and globalization, together with the disruptive technological innovations, increasingly frequent, do nothing but increase these differences.

Youth unemployment and general unemployment conceptually distance themselves from the challenges they face, specifically, as mentioned in the introduction, in the importance of having a good start in the labor market, because this favors their work trajectories (ILO, 2012). One proof of these differences is that the probability of young people being unemployed is three times greater than that of adults (ILO, 2017).

3.2.Theoretical Approach

The complexity of getting consensus on the conceptualization of youth unemployment, beyond a mere linkage to age, remains at the center of academic debate. Fom the reflections of Clark et al. (1979) on the real difficulty of distinguishing between young people classified as inactive and unemployed, and the discrepancies on the subject expressed by Flinn & Heckman (1983), later analyzed by Goldsmith, Veum, & Darity Jr (1995), there have been many the aspects that have centered the debate. For example, those reflected in the concerns of Singell & Lillydahl (1989) indicating that the available definitions are not operative for the study of the problem and that it is necessary to clarify the concept in order to properly design successful public policies.

One of the key aspects, according to the academic literature is the one related to transitions. The International Labor Organization (ILO) notes that transitions to decent work tend to be long and costly, but they could be reduced if educational levels are raised. In fact, the estrangement of education drives to some authors to propose the use of the NEETs concept to represent problematic transitions (Furlong, 2006).

On the other hand, in crisis circumstances, contraction or deceleration of the economy, countries often resort to reducing spending on social, health or educational policies, which influence those who are involved in training programs and affect their opportunities to access the labor market.

Particularly, many of the young people who enter the labor market in the first years of economy's recovery (2014 onwards), have suffered cuts in education, social and health policies corresponding to the crisis period, in their teens times.

All these aspects are part of the complexity of youth unemployment and show the importance of other public policies not strictly linked to the labor market.

Although unemployment is a permanent policy concern, youth unemployment is a very specific and important particular concern, due to the possible effects of encysting unemployment, which may persist for a long time in the life of an individual. In addition, a group of "idle young people" may appear that could be a source of social problems (Goujard, Petrongolo, & Van Reenen, 2011).

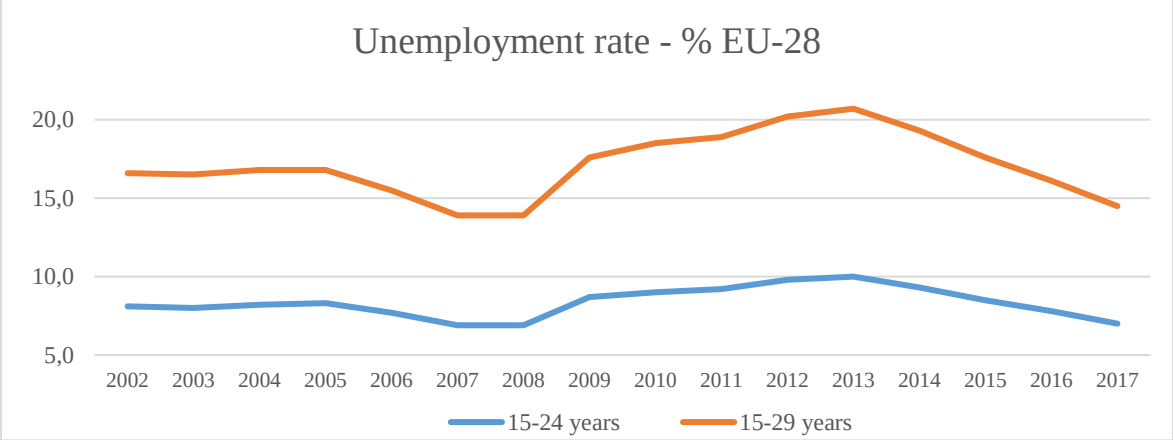
In the digital revolution era, it is especially necessary to design education-oriented to employment and boost continuous education and training for getting a successful labor insertion (Garimella, Shenoy, Pai, & Shetty, 2018). The challenges posed by the new technological environment will mean an increase in the demand for workers with skills related to science, technology, engineering and mathematics, and with transversal capacities that allow them to be versatile, which are predictably more developed in the youngest population, especially the so-called "millennials" or in the "digital natives". It is foreseeable that, according to the ILO, at the same time the need for workers at the intermediate levels will decrease, so it is very convenient that "digital natives" prepare for these adaptation processes, which can lead to the creation of new groups vulnerable and an increase in inequalities (ILO, 2017). It is, therefore, necessary to design inclusive policies

that address these risks in order to promote sustainable development and socio-economic well-being.

3.3.Empirical analysis of youth unemployment

Nearly a fifth of the world's youth do not have jobs, education or training. Even in times of economic recovery, the probability that a young person is unemployed is greater than that of an adult, labor poverty and low levels of productivity, together with informality, continue to represent important challenges; on the other hand, taking into account the population aging, young employees must face this situation, supporting their elders. Given this perspective, it is necessary to align efforts in order to guarantee the access of people to decent jobs (ILO, 2017). Among other issues, because it is important to highlight that the problems of young people's labor insertion go beyond their own well-being, also reaching some fundamental elements for general socioeconomic development (Arrazola Vacas, Galán, & Hevia Payá, 2018, Weller, 2007).Figure 3-1 shows the evolution of the youth unemployment rate for 15-24 years and, 15-29 years in the European Union, from 2002 to 2017, and the show the high levels and the influence of the economic situation.

Figure 3-1. Evolution of the youth unemployment rate in the European Union (EU-28)



Source: own calculations based on Eurostat data - Youth unemployment ratio by sex and age [yth_empl_140]

In many countries of the European Union, youth unemployment rates are currently high. This should not be attributed solely to the effects of the latest economic crisis, but to the imperfections of the labor market. In particular, the poor adjustment between business needs and, capacities of the aspirants to access the labor market, which leads to think about

the necessity of adaptation educational systems and training at different levels to employment requirements (Refrigeri & Aleandri, 2013).

The evolution of the youth population between 1997 and 2017 has experienced a growth of 139 million people, at the same time that the youth labor force was reduced by 34.9 million people, which implies a progressive decrease in the proportion of young people workers in the global context, which has gone from 21.7 to 15.5 percent.

The overall participation rate of the youth labor force has decreased over the past 20 years from 55 to 45.7 percent and in the OECD countries, almost 18 percent of unemployed youth have been without work for one year or more[11] (ILO, 2017).

In the context of the European Union, Greece, Spain and Italy show the highest youth unemployment rates, as shown in Table 3-1 and Figure 3-2, reaching 36% in January 2018 and second only to Greece with 42%. %.

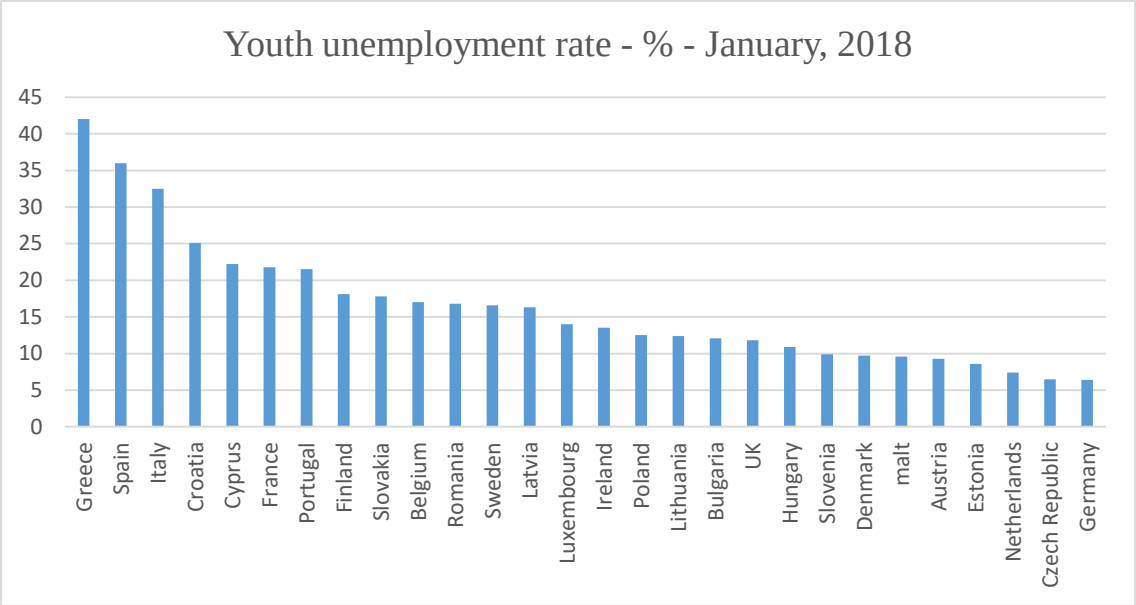
Table 3-1. Youth unemployment rate European Union (EU-28) - January 2018

Country	Youth unemployment rate %	Country	Youth unemployment rate %
Greece	42,0	Ireland	13,5
Spain	36,0	Poland	12,5
Italy	32,5	Lithuania	12,4
Croatia	25,1	Bulgaria	12,1
Cyprus	22,2	UK	11,8
France	21,8	Hungary	10,9
Portugal	21,5	Slovenia	9,9
Finland	18,1	Denmark	9,7
Slovakia	17,8	malt	9,6
Belgium	17,0	Austria	9,3
Romania	16,8	Estonia	8,6
Sweden	16,6	Netherlands	7,4
Latvia	16,3	Czech Republic	6,5
Luxembourg	14,0	Germany	6,4

Source: own elaboration with EUROSTAT data.

[11] All people between 15 and 74 years old (16 and 74 years old in Spain, Italy and the United Kingdom) who did not have a job during the reference week were considered as unemployed, they had actively searched for work during the last four weeks and were ready to start working immediately or within two weeks.

Figure 3-2. Youth unemployment rate European Union (EU-28) – January, 2018



Source: own elaboration with EUROSTAT data.

Many empirical studies show that recessions are particularly detrimental for young people because the risk of unemployment for this group increases much more than for other groups; on the other hand, the effects of these recessive cycles on youth employment have impacts on social welfare (Acedanski, 2016). The International Monetary Fund stated, in its April 2018 report, that the current situation allows the promotion of pro-cyclical policies and reforms to improve sustainable and inclusive growth in the medium and long term. Thus, structural reforms could be made and fiscal policies designed to increase inclusion and productivity, promoting participation in the labor market and directing investments towards young people in order to improve their employability (IMF, 2018).

Regarding the vulnerability that characterizes the youth work market, Acedanski (2016) affirms that the lack of access to the labor market in the early stages of youth has long-term impacts, estimated approximately in the following twelve years (for the case of Poland).

Concerning the time needed to obtain the first job, DellaVigna and Paserman (2005) empirically evaluate the effects of impatience on job search results and conclude that more patients show a reserve salary effect than impatience and therefore, the most impatient get a job before; they look less intensively and set a lower reserve salary. The time it takes to get the first job is related to the time spent studying, as confirmed by the ILO. In fact, it is 1.6 times higher for young people with primary education than for those who finish high

school , 1.7 times more for students than university studies, and 2.6 times more if comparing the lowest levels of studies with the highest ones (tertiary studies) (ILO, 2017).

All the above-mentioned problems, in a superficial way, require a systematic and thorough treatment for their resolution. However, in any case, dialogue, as well as social consensus, or institutional participation and collective bargaining are essential aspects for the interaction: labor policies framed in this context are essential to avoid situations of social exclusion and generate a stable and sustainable socio-economic environment (Pérez Ortiz et al., 2018)

One of the difficulties governments face is knowing which policies can be effective in reducing youth unemployment. Many of those introduced since 2008 were rather trying to find ways out of the recession. Currently, there is a wide range of Active Labor Market Policies, among which are those aimed at improving the access of disadvantaged youth to the labor market (Bell & Blanchflower, 2011). Some authors affirm that the empirical evidence on the effect of labor market regulation on youth employment is still not conclusive (Saar et al., 2008). In the presence of a strong union system, one could expect that stricter labor regulation would have potentially positive effects on the transitions from education to work (Estevez-Abe, Iversen & Soskice, 2001, Ryan, 2001). Ruesga Benito, Pérez Ortiz, and Viñas Apaolaza (2011) have analyzed the relationship between collective bargaining systems and the quality of employment in the aspects of equality, conciliation, and non-discrimination, as well as in the stability of employment and access to work. On the other hand, vocational training systems that teach specific skills and incorporate a strong work-based element help to avoid youth unemployment (Saar et al., 2008). Furthermore, low job protection seems to accelerate entry into the labor market, but at the cost of greater professional instability (Saar et al., 2008).

The provision of unemployment benefits is another way of protecting people against the risks of the labor market. European countries use different combinations of the two institutions. Boeri, Ignacio Conde-Ruiz, and Galasso, (2004) found that those countries adopting stronger dismissal restrictions tend to enjoy smaller unemployment benefit programs, and vice versa. Therefore, low job protection in some European countries (for example, in Denmark) is “compensated” by wider unemployment insurance and active labor policies. Instead, when the system reinforces comparatively more, unemployment benefits and mobility in the labor market is expected to increase, and the youth labor market

becomes more flexible, thus helping to foster youth employment (Saar et al., 2008). Esping-Andersen (2000) has a contrary opinion and believes that a system of strong unemployment subsidies has no effect on youth unemployment, because, from their point of view, most of those entering the labor market do not meet the requirements to access unemployment benefits.

Weller, (2007) explains that in some countries, special contracts linked to a reduction in labor rights have been proposed to promote youth employment, but these measures do not enjoy consensus.

Robotization and automation also affects youth employment, especially in jobs through the Internet, which extend to all sectors of the economy and the public and private sectors, as well as in the so-called "gig economy", referring to a hypothetical labor market in which specific hiring is carried out for specific jobs. This would mean new opportunities for the employment of the youngest as well as for work-life balance, however, these jobs are usually associated with lower wages and less social protection or greater labor uncertainties (ILO, 2017), affecting, as a consequence, some of the classic weaknesses of youth employment. This opens up new opportunities and new risks appear. At the same time that some of the vulnerabilities, traditionally associated with the characteristics of youth unemployment, can be increased. This situation highlights, once again, the role of technology as fundamental in youth employment, as well as the hazard of the emergence of new groups at risk of exclusion.

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APROXIMACIÓN TEÓRICA Y EMPÍRICA AL DESEMPLEO DE LOS JÓVENES

3. Aproximación teórica y empírica al desempleo juvenil (Theoretical and empirical approach to youth unemployment in Spanish)

3.1. Introducción (Introduction in Spanish)

El desempleo juvenil presenta características específicas que justifican sus condiciones especiales y explican por qué sus tasas son más elevadas que las alcanzadas para otros grupos sociales. Se conceptualiza como el desempleo de jóvenes generalmente 15-24 años (según EUROSTAT). El desempleo general se estudia para aquellas personas que están en edad de trabajar y que formando parte de la población activa se han quedado sin trabajo y están en busca de empleo. Sin embargo, las diferencias no están exclusivamente en la edad. La tipología y características de ambas clases de desempleo van más allá y muestran la complejidad correspondiente a los aspectos sociales y económicos del entorno. El dinamismo económico y la globalización, conjuntamente con las innovaciones tecnológicas disruptivas, cada vez más frecuentes, no hacen sino incrementar dichas diferencias.

El desempleo juvenil y el desempleo general se distancian conceptualmente en los desafíos a que se enfrentan, específicamente, tal como se ha citado en la introducción, en la importancia de tener un buen comienzo en el mercado de trabajo, porque esto cfavorece sus trayectorias laborales (OIT, 2012). Una prueba de estas diferencias es que la probabilidad de que los jóvenes estén en situación de desempleo es tres veces mayor que la de los adultos. (OIT, 2017).

3.2.Aproximación Teórica (Theoretical Approach in Spanish)

La complejidad de alcanzar un consenso sobre la conceptualización del desempleo juvenil, más allá de una mera vinculación a la edad sigue en el centro de los debates académicos, desde las reflexiones de Clark et al. (1979) sobre la dificultad real de distinguir entre los jóvenes clasificados como inactivos y los desempleados y las discrepancias sobre el particular manifestadas por Flinn y Heckman (1983), posteriormente analizados por Goldsmith, Veum y Darity Jr (1995), han sido muchos los aspectos que han centrado el debate. Por ejemplo, los reflejados en las preocupaciones de Singell y Lillydahl (1989) indicando que las definiciones disponibles no resultan operativas para el estudio del

problema y que es necesario clarificar el concepto para poder diseñar adecuadamente políticas públicas exitosas.

Uno de los aspectos clave, conforme a la literatura académica es el relacionado con las transiciones. La Organización Internacional del Trabajo (OIT) constata que las transiciones a hacia un trabajo decente suelen ser largas y costosas, pero son susceptibles de reducción si se consiguen aumentar los niveles educativos. De hecho, el alejamiento del sistema educativo, lleva a algunos autores a proponee el uso del concepto NINIs para representar las transiciones problemáticas (Furlong, 2006).

Por otra parte, en situaciones de crisis, contracción o desaceleración de la economía, los países recurren con frecuencia a la reducción del gasto en políticas sociales, de salud o educativas, que influyen en quienes están en período de formación y afectan a sus condiciones de acceso al mercado de trabajo. En concreto, muchos de los jóvenes que acceden al mercado de trabajo en los primeros años de recuperación de la situación económica (2014 en adelante), han padecido los recortes en educación, políticas sociales y sanitarias correspondientes al período de crisis, en el que les ha tocado vivir su adolescencia. Todos estos aspectos forman parte de la complejidad del desempleo juvenil y ponen de manifiesto la importancia de las otras políticas públicas no vinculadas estrictamente al mercado laboral.

Aunque el desempleo es una preocupación de política permanente, el desempleo juvenil es una preocupación particular muy específica e importante, debido a los posibles efectos de enquistamiento del desempleo, que pueden persistir durante mucho tiempo en la vida de un individuo. Además, puede aparecer un grupo de "jóvenes ociosos" que podría ser fuente de problemas sociales (Goujard, Petrongolo y Van Reenen, 2011).

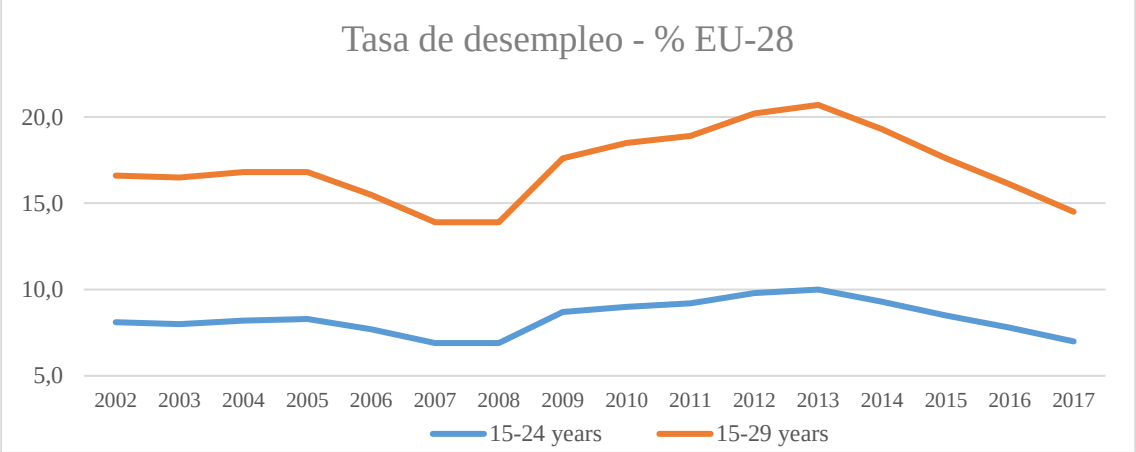
En la era de la revolución digital, es especialmente necesario diseñar la educación orientada al empleo e impulsar la educación y la capacitación continuas para lograr una inserción laboral exitosa (Garimella, Shenoy, Pai y Shetty, 2018). Los retos planteados por el nuevo entorno tecnológico supondrán un incremento en la demanda de trabajadores con habilidades relacionadas con la ciencia, tecnología, ingeniería y matemáticas, y con capacidades trasversales que le permitan ser versátil, las cuales previsiblemente se encuentren más desarrolladas en la población más joven, especialmente en los llamados "millenials" o en los "nativos digitales". Es previsible que, según indica la Organización Internacional del Trabajo, al mismo tiempo disminuya la necesidad de trabajadores de

niveles intermedios, por lo que es muy conveniente que los "nativos digitales" se preparen para estos procesos de adaptación, que pueden llevar a la creación nuevos grupos vulnerables y a un aumento de desigualdades (OIT, 2017).. Es pues necesario el diseño de políticas inclusivas que afronten estos riesgos de cara al fomento del desarrollo sostenible y del bienestar socio-económico.

3.3. Análisis empírico del desempleo juvenil (Empirical analysis of youth unemployment in Spanish)

Cerca de la quinta parte de la juventud mundial no tiene empleo, educación o capacitación. Incluso en momentos de recuperación económica, la probabilidad de que un joven esté desempleado es mayor que la de un adulto, la pobreza laboral y los bajos niveles de productividad, junto con la informalidad continúan representados retos importantes, por otra parte, teniendo en cuenta el envejecimiento poblacional, los jóvenes empleados deberán hacer frente a esta situación, apoyando a sus mayores. Ante esta perspectiva, se requiere alinear esfuerzos con el fin de garantizar el acceso de las personas a trabajos decentes (OIT, 2017), entre otras cuestiones, porque conviene resaltar que los problemas de la inserción laboral de los jóvenes trascienden a su propio bienestar, alcanzando también algunos elementos fundamentales para el desarrollo socioeconómico en general (Arrazola Vacas, Galán y de Hevia Payá, 2018; Weller, 2007). En la Figura 3-1 se muestra la evolución de la tasa de desempleo juvenil para 15-24 años y 15-29 años en la Unión Europea, desde 2002 hasta 2017 y se comprueban los elevados niveles y la influencia de la situación económica.

Figura 3-1. . Evolución de la tasa de desempleo juvenil en la Unión Europea (UE-28)



Fuente: elaboración propia en base a datos de Eurostat - Youth unemployment ratio by sex and age [yth_empl_140]

En muchos países de la Unión Europea se encuentren actualmente elevadas altas tasas de desempleo juvenil que no deben achacarse únicamente a los efectos de la última crisis económica, sino a las imperfecciones del mercado de trabajo, en concreto al deficiente ajuste entre las necesidades empresariales y las capacidades de los aspirantes a acceder al mercado laboral, lo que lleva a pensar en la necesidad de la adecuación de los sistemas educativos y formación en los distintos niveles a las exigencias del empleo (Refrigeri y Aleandri, 2013).

La evolución de la población juvenil entre 1997 y 2017 ha experimentado un crecimiento de 139 millones de personas, al mismo tiempo que la fuerza de trabajo juvenil se redujo en 34,9 millones de personas, lo que supone una disminución progresiva en la proporción de jóvenes trabajadores en el contexto mundial, que ha pasado del 21,7 por ciento al 15,5 por ciento.

La tasa de participación global de la fuerza de trabajo juvenil ha disminuido en los últimos 20 años del 55,0 por ciento al 45,7 por ciento y en los países de la OCDE, casi el 18 por ciento de los jóvenes desempleados han estado sin trabajo durante un año o más[12] (OIT, 2017). Por lo que se refiere al desempleo juvenil, se estima que 70,9 millones de jóvenes estarán desempleados en 2017 (OIT, 2017).

En el contexto de la Unión Europeo Grecia, España e Italia muestran las tasas de desempleo juvenil más elevadas, según se muestra en la Tabla 3-1 y en la Figura 3-2, alcanzando en enero de 2018 el 36% y únicamente superado por Grecia con el 42%.

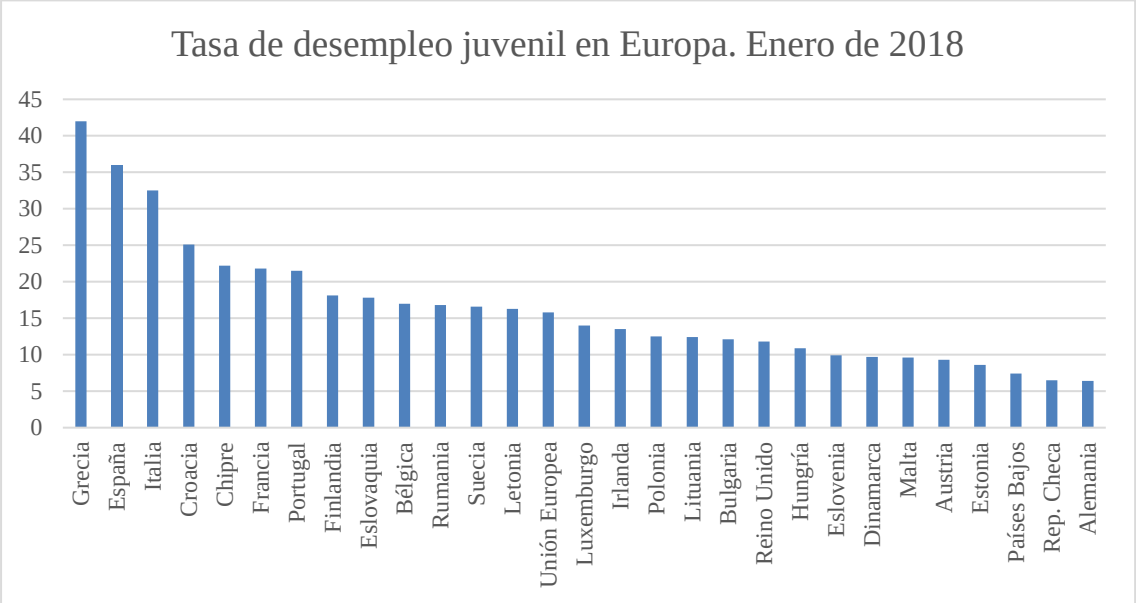
[12] Se consideran como desempleadas todas las personas de entre 15 y 74 años (16 y 74 años en España, Italia y Reino Unido) que no contaban con un empleo durante la semana de referencia, habían buscado activamente trabajo durante las últimas cuatro semanas y estaban listas para empezar a trabajar inmediatamente o en el plazo de dos semanas.

Tabla 3-1. Tasa de desempleo juvenil la Unión Europea (UE-28) - enero de 2018

País	Tasa de desempleo juvenil - %	País	Tasa de desempleo juvenil - %
Grecia	42,0	Irlanda	13,5
España	36,0	Polonia	12,5
Italia	32,5	Lituania	12,4
Croacia	25,1	Bulgaria	12,1
Chipre	22,2	Reino Unido	11,8
Francia	21,8	Hungría	10,9
Portugal	21,5	Eslovenia	9,9
Finlandia	18,1	Dinamarca	9,7
Eslovaquia	17,8	Malta	9,6
Bélgica	17,0	Austria	9,3
Rumania	16,8	Estonia	8,6
Suecia	16,6	Países Bajos	7,4
Letonia	16,3	Rep. Checa	6,5
Luxemburgo	14,0	Alemania	6,4

Fuente: elaboración propia con datos de EUROSTAT.

Figura 3-2.Tasa de desempleo juvenil en la Unión Europea (UE-28), enero de 2018



Fuente: elaboración propia con datos de EUROSTAT.

Muchos estudios empíricos muestran que las recesiones son particularmente perjudiciales para los jóvenes porque el riesgo de desempleo para este grupo aumenta mucho más que para otros grupos, por otra parte, los efectos de estos ciclos recesivos en el empleo juvenil tienen impactos en el bienestar social (Acedanski, 2016). El Fondo Monetario Internacional afirma, en su informe de abril de 2018, que la coyuntura actual permite la promoción de políticas y reformas procíclicas para mejorar el crecimiento sostenible e inclusivo en un medio y largo plazo. Así, se podrían realizar reformas estructurales y diseñar políticas

fiscales para aumentar la inclusión y la productividad; impulsando la participación en el mercado de trabajo y dirigiendo inversiones hacia los jóvenes de cara a mejorar su empleabilidad (Fondo Monetario Internacional, 2018).

En cuanto la vulnerabilidad que caracteriza al mercado de trabajo juvenil, Acedanski (2016) afirma que la falta de acceso al mercado de trabajo en los primeros estadios de la juventud tiene impactos en un largo plazo, que estima aproximadamente en torno a los doce años siguientes (para el caso de Polonia).

Respecto al tiempo necesario para obtener el prier empleo, DellaVigna y Paserman (2005) evalúan empíricamente los efectos de la impaciencia en los resultados de búsqueda de trabajo y concluyen que las personas más pacientes muestran un efecto salario de reserva superior al de impaciencia y por tanto, las personas más impacientes consiguen antes un empleo, buscan menos intensamente y establecen un salario de reserva más bajo. El tiempo que se tarda en conseguir el primer empleo está relacionado de forma negativa con el tiempo dedicado al estudio, según confirma la OIT, ya que este ya que este es 1,6 veces mayor para los jóvenes con estudios primarios que para los que terminaron la secundaria, 1,7 veces más largo para los jóvenes con estudios secundarios que para los de estudios universitarios, y 2,6 veces más larga si se comparan los niveles de estudios más bajos (estudios primarios) con los más altos (estudios terciarios) (OIT, 2017).

Todos los problemas antes apuntados de manera somera, requieren un tratamiento sistemático y profundo para su resolución, sin embargo, en cualquier caso, resulta imprescindible tanto el diálogo, como la concertación social, o la participación institucional y la negociación colectiva como aspectos fundamentales para la interacción: las políticas laborales enmarcadas en este contexto son esenciales para evitar situaciones de exclusión social y generar un entorno socio-económico estable y sostenible (Pérez Ortiz et al., 2018).

Una de las dificultades a las que se enfrentan los gobiernos es saber qué políticas pueden ser eficaces para reducir el desempleo juvenil. Muchas de las introducidas desde 2008 trataban más bien de buscar salidas a la recesión. En la actualidad, hay una amplia gama de Políticas Activas del Mercado Laboral, entre ellas se encuentran las dirigidas a mejorar el acceso de los jóvenes desfavorecidos al mercado laboral (Bell y Blanchflower, 2011). Algunos autores afirman que la evidencia empírica sobre el efecto de la regulación del mercado laboral en el empleo juvenil todavía no es concluyente (Saar et al., 2008). En presencia de un sistema sindical fuerte, se podría esperar que una regulación laboral más

estricta tuviese efectos potencialmente positivos en las transiciones de la educación al trabajo (Estevez-Abe, Iversen y Soskice, 2001; Ryan, 2001). Ruesga Benito, Pérez Ortiz, y Viñas Apaolaza (2011) han analizado la relación entre los sistemas de negociación colectiva y la calidad del empleo en los aspectos de igualdad, conciliación y no discriminación, así como en los de estabilidad del empleo y acceso al trabajo. Por otra parte, los sistemas de formación profesional que enseñan habilidades específicas e incorporan un fuerte elemento basado en el trabajo ayudan a evitar el desempleo juvenil (Saar et al., 2008), además, la baja protección del empleo parece acelerar la entrada en el mercado, pero a costa de una mayor inestabilidad profesional (Saar et al., 2008).

La provisión de subsidios de desempleo es otra forma de proteger a las personas contra los riesgos del mercado laboral. Los países europeos utilizan diferentes combinaciones de las dos instituciones. Boeri, Ignacio Conde-Ruiz, y Galasso, (2004) comprobaron que aquellos países que adoptan restricciones de despido más fuertes tienden a disfrutar de programas de subsidios de desempleo más pequeños, y viceversa. Por lo tanto, la baja protección del empleo en algunos países europeos (por ejemplo, en Dinamarca) se "compensa" con un seguro de desempleo más amplio y con políticas laborales activas. En cambio, cuando el sistema refuerza más, comparativamente, las prestaciones de desempleo, se espera que aumente la movilidad en el mercado laboral y que el mercado laboral juvenil se flexibilice, consiguiendo, de este modo favorecer el empleo juvenil (Saar et al., 2008). Esping-Andersen (2000) tiene una opinión contraria y cree que un sistema de subsidios de desempleo fuerte no tiene efectos sobre el desempleo juvenil, porque, desde su punto de vista, la mayoría de los que ingresan al mercado laboral no alcanzan los requisitos para acceder a los beneficios de desempleo.

Weller, (2007) explica que en algunos países se han propuesto contratos especiales vinculados una reducción en los derechos laborales para fomentar el empleo juvenil, pero estas medidas no gozan de consenso general.

La robotización y automatización afecta también al empleo juvenil, sobre todo en empleos a través de internet, que se extienden a todos los sectores de la economía y al ámbito público y al privado, así como en la llamada "gig economy", refiriéndose a un hipotético mercado de trabajo en el que se realizan contrataciones puntuales para trabajos específicos. Esto supondría nuevas oportunidades para el empleo de los más jóvenes y a la conciliación, sin embargo, estos trabajos suelen ir asociados con salarios más bajos y a menor protección

social o mayores incertidumbres laborales (OIT, 2017), incidiendo, como consecuencia en algunas de las debilidades clásicas del empleo juvenil. Se abren así nuevas oportunidades y aparecen nuevos riesgos, al mismo tiempo que se pueden potenciar algunas de las vulnerabilidades tradicionalmente asociadas a las características propias del desempleo juvenil. Esta situación destaca, una vez más, el papel de la tecnología como fundamental en el empleo juvenil, así como los riesgos de aparición de nuevos grupos en riesgo de exclusión.

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EDUCATION, TECHNOLOGY AND YOUTH EMPLOYMENT

4. Education, technology and youth employment

4.1. PUBLICATION 1: A new educational pattern in response to new technologies and sustainable development. Enlightening ICT skills for youth employability in the European Union.

ARTICLE IN PRESS

Telematics and Informatics xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Telematics and Informatics

journal homepage: www.elsevier.com/locate/tele

A new educational pattern in response to new technologies and sustainable development. Enlightening ICT skills for youth employability in the European Union

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ARTICLE INFO

Keywords:
ICTs education
Youth employment
Higher education
Structural equation modelling

JEL Classification:
I2
J2

ABSTRACT

The so-called fourth revolution is underway and its impact is appreciated in societies and in the way of life of people, particularly due to its effects on the labor market. The disruption generated by the fast changes point out to the immediacy of the needed changes in higher education for responding the new and changing world. The millenarians or digital natives are already used to living with technology, but the technological changes are so fast that if they do not prepare to face them, they will become obsolete soon. Hence the importance of continuous training and the need for institutions and companies to promote training courses for their employees. The higher education institutions have a key role on the promotion of knowledge and on the innovation, but this new scenario is an unexpected challenge that is difficult to face. Incorporating teaching of information and communications technology in universities within the curriculum, as a cross-training topic, is a difficult but necessary challenge for preparing students for success in labor market. In this paper, the importance of training in ICTs to get a job is raised. An empirical study with EUROSTAT data is carried out and is limited to young people between 16 and 24 years old. Structural Equation Modelling is the applied method. The results indicate that informal ICTs training favors employment and training in computer management. The conclusions point to the need to providing channels of self-training or informal personal training to fit the needs and temporal and spatial availability of each.

1. Introduction

From the eighteenth century, the industrial revolution, radically transformed life at a planetary level. The three phases of the industrial revolution were continued with the forth revolution. The quick advances on Information and Communications Technologies (ICTs) drafts nowadays something similar with the extent of the internet, virtual environments, robotics, and artificial intelligence, but these new changes are probably are coming more, and more promptly, shaping a new industrial revolution of greater disruptive force than it could be initially expected. As World Economic Forum stated, in 2005, there were just 500 million devices connected to the Internet; today there are 8 billion, and it's estimated that by 2030 there will be 1 trillion (World Economic Forum – WEF, 2016). The innovation era is now, and it should start focusing on people. Despite the robotics importance on new production systems, the human capital is decisive within the workforce, and, in a fast-changing knowledge economy, 21st century digital skills drive organizations' competitiveness and innovation capacity (van Laar et al., 2017). In this context, Universities have to face

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http://dx.doi.org/10.1016/j.tele.2017.09.014
Received 22 May 2017; Received in revised form 5 July 2017; Accepted 28 September 2017

Please cite this article as: Picatoste, J., Telematics and Informatics (2017), http://dx.doi.org/10.1016/j.tele.2017.09.014

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Abstract

The so-called fourth revolution is underway and its impact is appreciated in societies and in the way of life of people, particularly due to its effects on the labor market. The disruption generated by the fast changes point out to the immediacy of the needed changes in higher education for responding the new and changing world. The millenarians or digital natives are already used to living with technology, but the technological changes are so fast that if they do not prepare to face them, they will become obsolete soon. Hence the importance of continuous training and the need for institutions and companies to promote training courses for their employees. The higher education institutions have a key role on the promotion of knowledge and on the innovation, but this new scenario is an unexpected challenge that is difficult to face. Incorporating teaching of information and communications technology in universities within the curriculum, as a cross - training topic, is a difficult but necessary challenge for preparing students for success in labor market. In this paper, the importance of training in ICTs to get a job is raised. An empirical study with EUROSTAT data is carried out and is limited to young people between 16 and 24 years old. Structural Equation Modelling is the applied method. The results indicate that informal ICTs training favors employment and training in computer management. The conclusions point to the need to providing channels of self-training or informal personal training to fit the needs and temporal and spatial availability of each.

Keywords: ICTs education, youth employment, higher education, Structural equation modelling

1. Introduction

From the eighteenth century, the industrial revolution, radically transformed life at a planetary level. The three phases of the industrial revolution were continued with the forth revolution. The quick advances on Information and Communications Technologies (ICTs) drafts nowadays something similar with the extent of the internet, virtual environments, robotics, and artificial intelligence, but these new changes are probably are coming more, and more promptly, shaping a new industrial revolution of greater disruptive force than it could be initially expected. As World Economic Forum stated, in 2005, there were just 500 million devices connected to the Internet; today there are 8 billion, and it's estimated that by 2030 there will be 1 trillion (WEF, 2016). The innovation era is now, and it should start focusing on people. Despite the robotics importance on new production systems, the human capital is decisive within the workforce, and, in a fast-changing knowledge economy, 21st century digital skills drive organizations' competitiveness and innovation capacity (van Laar et al., 2017). In this context, Universities have to face disruptive environments due to ICTs revolution, both as teaching and learning tool and as a new and crucial subject to teach for giving an integral formation to the students, who are mainly the so called "millennial generation" (the first generation borne immersed in new technologies). Davies et al. (2011) pointed out that success in the labor market is linked to the new media literacy and virtual collaboration, since they are two of the crucial skills that will be needed in the future workforce. In this field, younger individuals are the best performed for becoming Technology-Savvy Employees. The millennials are strongly skilled in these new communication and information technologies and they feel comfortable in virtual environments. This ICTs skills gives them a comparative advantage for social networking and their confidence on virtual collaborative atmospheres gives them the opportunity of integrating these productivity-enhancers into their work. In this sense, their particular innate conditions are in favor to their fast adaptation to technological changes and to quickly familiarize to self-learning digital environments.

The changing pedagogical models and the incorporation of Knowledge innovation is essential for universities survival. Milošević et al. (2015) stated that Global network for higher education is not a fantasy and that leading scientists have begun to implement elements of research in teaching, because they know that universities and their colleges

cannot exist separately from the social and technological environment, that is to say, from the current moment, so they must make progress in wider educational strategy of knowledge production. The main goal of universities is providing a solid and operative formation to their students, which lead them to achieve success in their personal and professional lives, as well as bring the results back to society in terms of general welfare. One main step for achieving this goal is to give to the university students' actual opportunities for getting a good job, since current trends reveal that it is not only the quantity of jobs but also the quality of jobs that matters, as few youth have access to productive employment opportunities that provide them with a decent wage, job security and good working conditions (ILO, 2017). Youth employment remains a global challenge and a top policy concern worldwide. The attendance to the university makes individuals more competitive in labor market, since university-educated youth are more likely to attain their desired job on their first try, but the changes introduced by the fourth revolution have to be assumed for a complete success at the university level. Growing up in the center of fast technological changes and globalization, today's youth are already expert on walking through unpredictable times and actually ready for assuming all kind of vicissitudes (Elder and Rosas, 2015). Since youth employment is a top policy concern, this paper deals with the importance of ICTs skills for getting a job.

After this introductory section, this paper analyzes the literature for focus the theoretical framework, attending the importance of ICTs both in education and in the labor market, and it stablish the main objectives of this work. The third section explain the material and methods and the results are shown in section four. The last section summarizes the main conclusions. The output of the computation with the results is shown in annex.

2. Technology, higher education and labor market

Disruptive changes to business models will have a profound impact on the employment landscape over the coming years (WEF, 2016). The technological changes high speed is out of doubt, the spread of the internet worldwide took only seven years. In addition, it cost decreases continuously. The Citi GPS Disruptive Innovations III report argued that stated that the cost of innovation extent, by means of the internet, continues to fall, as an example the cheaper smartphones, which will help bring four billion more people online. Over 96%

of institutional clients who participated in Citi's survey on technology and work believe that automation will accelerate over the next five years vs. the previous five years (Citi, 2016). The world economy has greatly benefitted from technological advances. These advances have had important effects on the labor market. The impact of ICTs on labor market shows significant differences across countries and over time. Nevertheless, only some particular kind of jobs can be done by machines, then there are some skills which reinforce the employ maintenance (Peng et al., 2017).

On the other hand, the society of knowledge is related to the sustainable development from a global perspective, since social sustainability is one of its pillars. Sustainable development is a general objective all over the world. This goal should be contextualized and properly balanced between all its areas. The triple bottom line (Brundtland, 1987) points to the three pillars for sustainability: environmental, economic and social and sustainability are all of them key pillars for achieving this goal. Moreover, the greater economic self-reliance of territories, supported by ICTs, can benefit both environmental sustainability and work opportunities (Robertson, 1995). The welfare of societies, employment and sustainability are wide and interrelated goals (Pociovălișteanu et al., 2015) and closely related to society and people way of life (Novo-Corti et al., 2015). This interconnection is reinforced by globalization and Technologies of Communication and Information spreading, which should be accessible for everybody, and that is why the plenty access to the internet, both technical and economic, is an objective for policy makers (Alam, 2017; Leung and Zhang, 2017; Novo-Corti and Barreiro-Gen, 2015). Relating to the education and training, they will need to respond to the growing significance of the environment, of sustainable local economies, and of sustainable household management, as well as to the growing importance of ICTs (Robertson, 1995). Sustainable higher education environments are wider than just a high-quality educative content (ie. Generating inclusive environments, (Novo-Corti et al., 2015) and its scope goes beyond the time at the University, because it influences people performance and wellbeing all along their lives.

2.1. Education and skills in the 21st century

The education has ever been a key factor for achieving an employment. In the fourth industrial revolution era, the advances in technology are making a broader range of non-

routine tasks automatable, with computers replacing mostly low-income low-skilled workers in the coming decades (Citi, 2016). The greater level of education of a country the highest level of per capita income, because, a greater level of education results in higher labor productivity, and a greater level of education in the whole society tend to boost a higher rate of aggregate growth (Goldin and Katz, 2009). The key issue in the context of the fourth revolution, the one of knowledge and technology, to focus properly the adequate type of knowledge that colleges and universities should offer to respond the companies and societies demand on skilled knowledge. Most of these skills are under the umbrella of the so-called digital competences, which are a set of different skills for achieving a good performance on digital society and which is a multi-faceted moving target, covering many areas and literacies and rapidly evolving as new technologies appear. Ferrari (2012) understand the Digital Competence as the convergence of multiple areas, related to the ability for understanding media, searching for information from a critical point of view and being able to communicate by means of various digital tools and applications (mobile, internet).

Table 4-1. Digital skills

Framework with 21st-century digital skills	
Core skills	**Contextual skills**
Technical	Ethical awareness
Information management	Cultural awareness
Communication	Flexibility
Collaboration	Self-direction
Creativity	Lifelong learning
Critical thinking	
Problem solving	

Source: Adaptation from van Laar et al. (2017).

Then, for achieving these abilities is necessary to handle different disciplines and getting some competencies related to digital literacy. Facing this challenge is one important issue for Universities nowadays. Nevertheless, it seems to be very difficult to take this renewal from the traditional curricula perspective. Van Laar et al. (2017) have identified seven core skills for success in (technical, information management, communication, collaboration, creativity, critical thinking and problem solving) and five contextual skills (ethical awareness, cultural awareness, flexibility, self-direction and lifelong learning) (Table 1) and they point out that the dynamic changes in the types of jobs demanded by the

knowledge society pose serious challenges to educational systems, as they are currently asked to prepare young people for jobs that may not yet exist.

The European Centre for the Development of Vocational Training (CEDEFOP) assessed that in the European Union nearly half of the new job opportunities will require highly skilled workers (Citi, 2016). Improving education and training are key issues. They should be ready to prepare people for their personal as well as vocational life, in the context of globalized economies, international competitiveness, and ICTs era, where sustainable development should be achieved. This improvement of education should focus not only on vocational preparation, but also on personal preparation, not only for the information age, but also for sustainable development, and for "constructive and useful participation in society, household and family" (Robertson, 1995). Long-life learning and training become core issues for getting a whole educative context. Lifelong learning is a continuous, voluntary, and self-motivated act to expand one's own knowledge (Kaur and Beri, 2016). The self-learning and personal implication on informal education come into the scene as an important player. Particularly, attending the fast changes in the knowledge society and the difficulty of assuming these changes by the traditional academic curricula. It has been proved (Chuang, 2017; Hsiao et al., 2017; Milošević et al., 2015; Novo-Corti et al., 2013), that there is a wide range of possibilities for introducing the informal ICTs environments in formal education, in a simple way, more as a tool than as specific curricula content. Then, "learning by doing" gives a strong support for acquiring ICTs competencies as well as for improving students' performance in the typical curricular subjects. As a consequence, their integral technological knowledge and competencies will probably fit better with labor market exigencies. The innovative employability structure suggests that with the enhanced prevalence of ICT a wide array of individual factors impinges on employability (Green, 2017). Hasanefendic et al. (2016) argue that the actual policy discourse is increasing the pressure on higher education institutions for attending the claims of employers and their results indicates that best learning practices can have a potentially central role in minimizing the skill/labor market mismatch and that developing modern pedagogies could diminish the closure of the skill/labor market gap.

Required skills in the labor market are changing quickly, but computing systems are also changing at the same speed, so it would be possible understanding and anticipate these

changes in labor markets in near-real time, and trying to re-shape education and training policies in a timelier manner to help to narrow the widening skills gap (WEF, 2016). Handling the resources for adapting the education to these changes is an important task for policymakers.

2.2. ICTs and employment

The extent of technological change is growing. The big data revolution and advances in machine learning algorithms indicates that the occupations that can be replaced by technology are also increasing, and this includes those tasks that were once thought just for humans, such as driving a car or interpreting handwriting (Citi, 2016). Rifkin (1995) stated that the technological advances lead to entering into a new phase in world history: one in which fewer and fewer workers will be needed to produce the goods and services for the global population, but it is only one part of the history. Technological advances have allowed the robotization of certain tasks, where machines replace people. However, robots cannot replace people in skilled jobs. Rifkin words should be interpreted in its proper context, but the importance of the phenomenon should not be undervalued, since in the OECD the data shows on average 57% of jobs are susceptible to automation, this number rises to 69% in India and 77% in China (Citi, 2016).

Actually, some jobs may be diminished, but others will increase: who will manufacture the robots? On the other hand, information and communication technologies (ICTs) have largely freed employees from the restrictions of a fixed, central work place, enabling mundane tasks to be distributed across remote locations, and these advancements make possible for corporations implementing flexible policies that allow employees to arrange their work and family concerns autonomously (Leung and Zhang, 2017). The core of this work is not addressed to the discussion about the advancements on ICTs and its effects and their assessment on the labor market, but it is important to be aware of the extent and importance of this issue. This work analyzes the relation on ICTs knowledge and the employment for young people in the European Union, since it is a key factor for understanding the disruption of higher education in the 21st century due to ICTs and its effects on students' employability and their possibilities of getting a decent work. Because, scaling up investments in decent jobs for youth is the best way for ensuring young people

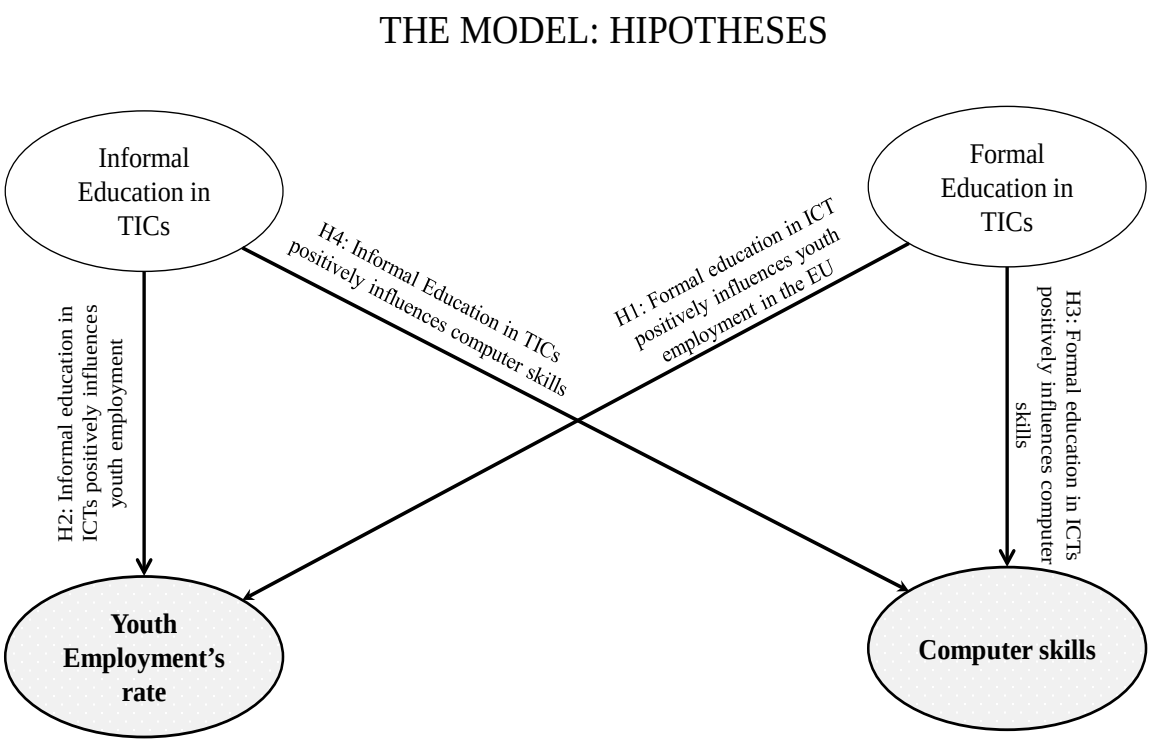
to achieve their aspirations and actively participate in society. It is also an investment in the well-being of societies and inclusive and sustainable development (Elder and Rosas, 2015). Moreover, there is a growing divergence in earnings between the most-educated and least-educated workers. The more skilled workers have the highest wages, despite that the supply of educated workers has also increased, which is a sign of the increase in the relative demand for skilled labor. On the other hand, those with the least education, who typically already had the lowest wages, this change has increased overall income inequality (Brynjolfsson and McAfee, 2011).

Technological advancements together with the globalization are meaningfully transforming work. However, "education and training systems, having remained mostly static and under-invested in for decades, are largely inadequate for these new labor markets" (WEF, 2016).1 Taking into account the current socioeconomic environment and the academic literature on this subject, it is verified that the training (formal and informal education) in ICTs is a fundamental aspect to find a job. Hence, the hypotheses to be contrasted in this work are those included in Table 2 and refer to the positive influence on the employment of such training. Four hypotheses are being tested: Two of them related to the influence of ICTs education on employment and other two related to the influence of ICTs education on Computers Skills. In addition, the formal and informal education influence was considerate separately (see Figure 4-1).

Table 4-2. Hypotheses

Hypotheses
H1: ICTsFE positively influences on youth employment in the European Union
H2: ICTsIE positively influences on youth employment in the European Union
H3: ICTsFE positively influences on youth Computers Skills in the European Union
H2: ICTsIE positively influences on youth Computers Skills in the European Union

Figure 4-1. The proposed model and the Hypotheses



3. Material and methods

Since the main goal of this paper is to analyze the influence of ICTs education on employment and Computers Skills in the European Unión for the youth, the data source was EUROSTAT, particularly the Youth data from the section Population and Social Conditions. Following EUROSTAT methodology, youth are considered those people between 15 and 24 years. All data are referred to that age range. Structural Equations Modelling is the most suitable method for assessing causal relations among unobservable variables. This method was proved as very effective for analyzing the ICTs use, impact and influence in education, from different perspectives (Lee et al., 2017; Milošević et al., 2015; Varela-Candamio et al., 2014).

For testing causal relations, a linear regression analysis is the proposed method. Nevertheless, since the involved variables are not directly measurable, the most suitable method for performing this analysis is the structural equation modelling, which lets the "construction" of those latent variables (or "constructs") by means of confirmatory factorial

analysis, and, at the same time, is suitable for explaining causal relations between the latent variables. The IBM SPSS Statistics and AMOS 21 was the utilized software.

Table 4-3. Latent Variables and indicators

Latent Variable	Item	Content
ICTsFE	High Education	Individuals with high education (levels 5-8) who have obtained IT skills through formalized educational institution (school, college, university, etc.)
	Medium Education	Individuals with medium education (levels 3-4) who have obtained IT skills through formalized educational institution (school, college, university, etc.)
	Low Education	Individuals with low education (levels 1-2) who have obtained IT skills through formalized educational institution (school, college, university, etc.)
	ICTsFE Males	Males who have obtained IT skills through formalized educational institution (school, college, university, etc.)
	ICTsFE Females	Females who have obtained IT skills through formalized educational institution (school, college, university, etc.)
ICTsIE	Self-Training	Individuals who have obtained IT skills through self-study (learning by doing)
	Adult Education	Individuals who have obtained IT skills through training courses and adult education centers
COMPUTERS SKILLS	For Job	Individuals who judge their current computer or internet skills to be sufficient if they were to look for a job or change job within a year
	For Computer Protection	Individuals who judge their current computer or internet skills to be sufficient to protect their personal data
	For Data Protection	Individuals who judge their current computer or internet skills to be sufficient to protect their private computer from virus or other computer infection
EMPLOYMENT	Primary Education	Employment of people 15 to 24 years for low education level (0-2)
	Secondary Education	Employment of people 15 to 24 years for medium education level (3-4)
	Tertiary Education	Employment of people 15 to 24 years for high education level (5-8)

The Structural Equation Modelling has two main components: the measurement model and the structural model, for assessing the latent variables construction and the causal relations, respectively. The latent variables in the proposed model are the ICTs Formal Education (ICTsFE), the ICTs Unformal Education (ICTsIE), the Employment and the Computers skills. It is convenient to notice that the variable "Employment" could be taken as an observable variable, but to capture desegregate information related to education and employment, the variable was "constructed" taking account the different employment rates

for the three educational levels. The latent variables for the model and their indicators are shown in Table 4-3. Moreover, information about the particular item of the database is also provided.

4. Results

The Structural Equation Modelling, related to the measurement model, indicates that the estimated coefficients for the indicators, which are constructing the latent variables, are all statistically significant ($p < .05$), then we conclude that this significance of parameters indicates that the proposed relationship between analyzed variables has a substantial effect on the latent variable.

The equations for the measurement model (standardized estimates) are:

$$x_{11} = 0.28\,\xi_1 \quad (1)$$

$$x_{21} = 0.96\,\xi_1 \quad (2)$$

$$x_{31} = 0.61\xi_1 \quad (3)$$

$$x_{41} = 0.93\,\xi_1 \quad (4)$$

$$x_{51} = 0.99\xi_1 \quad (5)$$

Where:

$\xi_1 = ICTsFE$,

x_{11} = Individuals with high education (levels 5-8) who have obtained IT skills through formalized educational institution (school, college, university, etc.),

x_{21} = Individuals with medium education (levels 3-4) who have obtained IT skills through formalized educational institution (school, college, university, etc.),

x_{31} = Individuals with low education (levels 1-2) who have obtained IT skills through formalized educational institution (school, college, university, etc.)

x_{41} = Males who have obtained IT skills through formalized educational institution (school, college, university, etc.)

x_{51} = Females who have obtained IT skills through formalized educational institution (school, college, university, etc.)

$$x_{12} = 0.69\,\xi_2 \quad (6)$$

$$x_{22} = 0.66\,\xi_2 \quad (7)$$

Where:

$\xi_2 =$ ICTsIFE,

$x_{12} =$ Individuals who have obtained IT skills through self-study (learning by doing),

$x_{22} =$ Individuals who have obtained IT skills through training courses and adult education centers

$$y_{11} = 0.81\,\eta_1 \quad (8)$$

$$y_{21} = 0.92\,\eta_1 \quad (9)$$

$$y_{31} = 0.74\,\eta_1 \quad (10)$$

Where:

$\eta_1 = Employment$,

$y_{11} =$ Employment of people 15 to 24 years for low education level (0-2)

$y_{21} =$Employment of people 15 to 24 years for medium education level (3-4)

$y_{31} =$Employment of people 15 to 24 years for high education level (5-8)

$$y_{12} = 0.59\,\eta_2 \quad (11)$$

$$y_{22} = 0.90\,\eta_2 \quad (12)$$

$$y_{32} = 0.97\,\eta_2 \quad (13)$$

Where:

$\eta_2 = Computers\ Skills$,

$y_{12} =$ Individuals who judge their current computer or internet skills to be sufficient if they were to look for a job or change job within a year.

$y_{22} =$ Individuals who judge their current computer or internet skills to be sufficient to protect their personal data.

$y_{32} =$ Individuals who judge their current computer or internet skills to be sufficient to protect their private computer from virus or other computer infection.

The assessment of the measurement model (see Table 4-4) is according to the literature scores for considering it adequate.

Table 4-4. Results for the measurement model

Latent Variable	Observable Variable	Squared Multiple Correlations (λ^2)	CR
ICTsFE	High Education	0.079	0.756
	Medium Education	0.922	
	Low Education	0.377	
	ICTsFE Males	0.868	
	ICTsFE Females	0.991	
ICTsIE	Self-Training	0.746	0.674
	Adult Education	0.432	
COMPUTERS SKILLS	For Job	0.586	0.900
	For Computer Protection	0.974	
	For Data Protection	0.900	
EMPLOYMENT	Primary Education	0.657	0.823
	Secondary Education	0.848	
	Tertiary Education	0.545	

The reliability and internal consistency of the model, was tested by means of composite reliability and variance extracted values. Composite reliability (CR) should take scores ≥0.5 (Bagozzi and Yi, 1988) for confirming the internal consistency of constructs. Discriminant validity, for measuring the accuracy with which the analysis instrument represents the variables, the average variance extracted (AVE) values exceed 0.5 score (Hair et al., 1999) are considered adequate. Al values are into the scores, except for the AVE for ICTsFE, due to the differences between the medium and the primary and high levels.

As regards the overall adjustment, the most common measures for global fitness of the model are the comparative fit index CFI and the χ^2. The CFI scores goes from 0 to 1, accepted values indicated that it should be as close as possible to 1, but it is acceptable CFI > 0.9. The Chi-Squared/Degrees of freedom score is 1.476. CMin=88.546, DF=60 and P-value= 0.010. The reference values are $0 \leq \chi^2/df \leq 2$ for a good fitting (Carmines & McIver, 1981).

The structural model results are shown in Table 4. The main result is that the ICTsFE is not statistically significant for explaining Employment neither Computers Skills, whilst the ICTsIE is statistically significant for the explanation of both variables.

Table 4-5. Results for the structural model

Dependent Variable	Independent variable	Estimator	Standardized Estimator	S.E.	C.R.	P	R^2 (fitted)
Employment	ICTsIE	4.208	0.643	1.704	2.469	0.014	0.420
	ICTsFE	0.127	0.113	0.228	0.558	0.577	
Computer Skills	ICTsIE	5.285	0.848	1.711	3.089	0.002	0.751
	ICTsFE	0.238	0.222	0.234	1.015	0.310	

Attending the results for structural model, shown in

Figure 4-2, Table 4-5 and in (14) and (15). The employment and Computer Skills are explained by means of ICTs education in a 42% and in a 75%, respectively. Taking account that the ICTsFE is not statistically significant for the explanation of none of these two latent variables (P-value 0.577 and 0.310, respectively), the relevant variable is the ICTsIE.

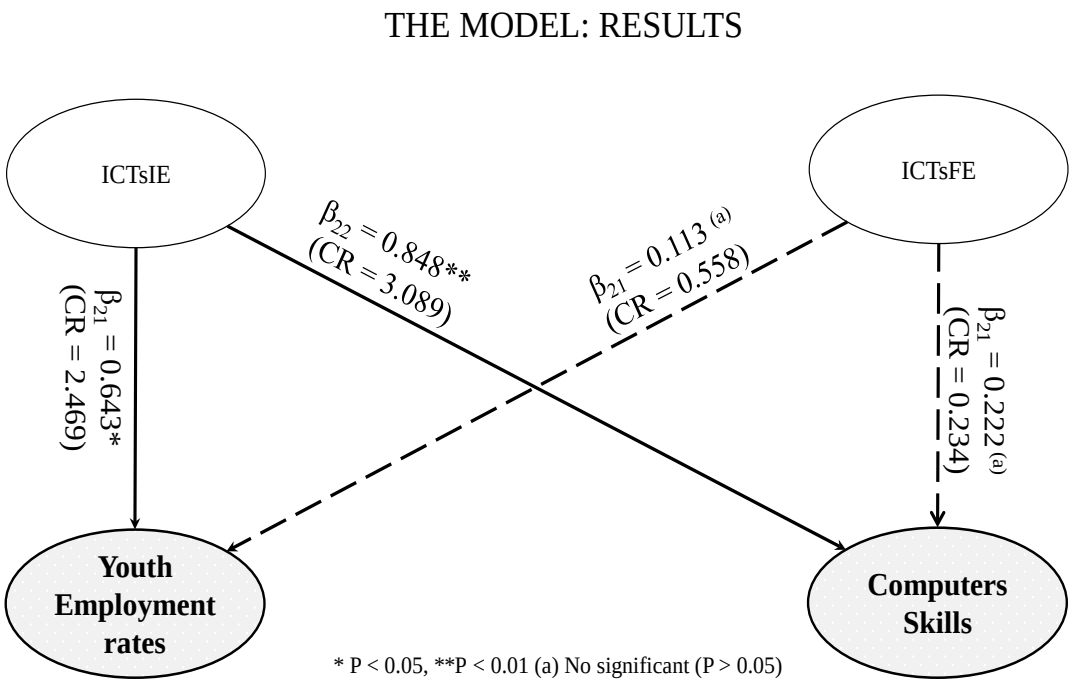
$$\eta_1 = 0.11\,\xi_1 + 0.64\,\xi_2 \quad (14)$$

$$\eta_2 = 0.22\,\xi_1 + 0.85\,\xi_2 \quad (15)$$

Table 4-6. Hypothesis testing

Hypotheses	Result
H1: ICTsFE positively influences on youth employment in the European Union	No supported
H2: ICTsIE positively influences on youth employment in the European Union	Supported
H3: ICTsFE positively influences on youth Computers Skills in the European Union	No supported
H4: ICTsIE positively influences on youth Computers Skills in the European Union	Supported

Figure 4-2. The proposed model and the Hypotheses



5. Conclusions

Current debates about the employment impact of disruptive change have sometimes been divided between those who foresee unlimited opportunities in newly emerging job categories and diagnoses that this scenario will improve workers' productivity and release them from repetitive work, and those that anticipate massive labor substitution and displacement of jobs (WEF, 2016). This debate is also in academia (Smith & Anderson, 2014). Nevertheless there is a common agreement on the urgency of getting skilled workers for facing this disruptive changes. The role of education becomes once again a focal point on the debate. Therefore, education on ICTs is a key factor for youth getting an employment, but also for helping societies to face successfully the forth industrial revolution. Anticipating the knowledge of some of this key skills needs will enhance this success for people and for societies. The results of this research point clearly to the

importance of boosting informal education on ICTs. Therefore, it would be interesting incentivize and enhance collaborative designs on education, labor and knowledge society public policies to be ready for the challenge.

The policy implications from these conclusions point to the importance of promotion of self-learning environments as well as the long-life learning in ICTs for achieving those competences suitable for increasing youth employability.

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4.2.PUBLICATION 2: Smart Cities for wellbeing: Youth employment and their skills on computers.

Smart cities for wellbeing: youth employment and their skills on computers

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Received 28 April 2017
Revised 19 August 2017
Accepted 26 September 2017

Abstract

Purpose – Smart cities can be understood as an inclusive space for each and everyone to achieve their best options, within the framework of sustainable development, where institutions boost information and technology environments that help achieve the highest individual and social well-being with the aim of improving the lives of citizens. The youth group (between 15 and 24 years) was severely affected by the crisis. In this paper, youth employability, in relation to the new challenges of smart cities, is analyzed in the EU with the aim of assessing the influence of information and communication technologies (ICTs) skills on youth employability.

Design/methodology/approach – By means of a mean analysis and structural equation modeling, the differences between the Eurozone and the other countries in the EU is analyzed, as well as the importance of information technology is and the computer skills for increasing youth employability.

Findings – The results indicate that awareness of the importance of IT skills is greater in the Eurozone and that computer skills are highly significant to explain the employability of young people.

Practical implications – The achieved conclusions point out to the training on computers skills as a key factor for boosting youth employment.

Social implications – This work could provide some tools to help policymakers design instruments for increasing youth employment, as well as to provide training mechanisms to obtain the skilled workforce needed for the enterprises that emerged in the environment of smart cities.

Originality/value – The main original value of this work is to relate computers skills and the employment rate for youth in the framework of the European Union.

Keywords European Union, Smart cities, ICTs, Structural equation modeling (SEM), Youth employment

Paper type Research paper

1. Introduction

Sustainable development is related to social issues as well as environmental and economic ones. In addition, technological and communication issues are also closely involved in that they boost sustainability in all of these areas. "A Smart City is a city seeking to address public issues via ICT-based solutions on the basis of a multi-stakeholder, municipally based partnership" (European Union, 2014 Directorate General for Internal Policies. Policy Department A: Economic and Scientific Policy).

Another interesting definition can be found in Angelidou (2015), Komninos (2015) and Mora, Bolici and Deakin (2017). Smart cities are a key point for urban sustainable development, which is focused on achieving more inclusive, egalitarian and just societies,

Journal of Science and Technology Policy Management
Vol. 9 No. 2, 2018
pp. 227-247
© Emerald Publishing Limited
2053-4620
DOI 10.1108/JSTPM-04-2017-0014

Smart cities for wellbeing: youth employment and their skills on computers

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Abstract

The smart cities can be understood as an inclusive space for each and every one, within the framework of sustainable development, where institutions boost information and technology environments which help to achieve the highest individual and collective well-being with the aim of improving the lives of citizens. The young people (between 15 and 24 years) was sternly affected for the crisis. In this paper the youth employability, in relation to the new challenges of smart cities, is analyzed in the EU, with the aim of assessing the influence of ICTs skills on youth employability. By means of a mean analysis and a Structural Equation Modelling the differences between the Euro Area and the other countries in the EU is analyzed, as well as the importance of information technologies and the computers skills for increasing youth employability. The results indicate that awareness of the importance of IT skills is greater in the euro area and that computer skills are highly significant to explain the employability of young people. The achieved conclusions point out to the training on computers skills as a key factor for boosting youth employment. This work could provide some tools to help policy makers to design instruments for increasing youth employment, as well as to provide training mechanisms to obtain the skilled workforce needed for the enterprises that emerged in the environment of smart cities. The main original value of this work is to relate the computers skills and the employment rates for youth in the framework of the European Union.

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1. Introduction

Sustainable development is related to social issues as well as environmental and economic ones. In addition, the technological and communication issues are closely involved to boost sustainability in all of this areas. “A Smart City is a city seeking to address public issues via ICT-based solutions on the basis of a multi-stakeholder, municipally based partnership” (European Union, 2014 Directorate General for Internal Policies. Policy Department A: Economic and Scientific Policy).

Another interesting definitions can be found in Angelidou (2015), Komninos (2015) and Mora, Bolici & Deakin (2017). The smart cities are a key point for urban sustainable development, which is the one focused on achieving more inclusive, egalitarian and just societies, where the well-being of the people is the main objective They target to “smart” development by means of improving the Information and Communication Technologies (ICTs) in their area. The widespread of ICTs aims to improve the well-being of people living in these urban areas by creating a “smart” environment accessible to everyone, which means achieving a more inclusive society. Then, it could be stated that achieving a more inclusive society could be considered one of the most important reasons for supporting the so called “smart cities”. Despite of the great differences on the definition about what a smart city is, there is a common agreement on their intrinsic character linked to sustainable development and ICTs for all, according EU 2020 goals (European Union, 2010). Actually, a smart life is the one that makes people feel and live better (Ho et al, 2015). The literature about smart cities is wide and multidisciplinary (Bibri & Krogstie, 2017) and some authors underlined the importance of the integration of technical and social perspectives (Levy & Ellis, 2006; Webster & Watson, 2002). Some definitions are provided in Table 4-7.

Table 4-7. Some definitions of Smart City

Definition	**Source**
The use of Smart Computing technologies to make the critical infrastructure components and services of a city -which include city administration, education, healthcare, public safety, real estate, transportation, and utilities - more intelligent, interconnected, and efficient	Washburn, D., & Sindhu, U. (2010). Helping CIOs understand "smart city" initiatives: Defining the Smart City, Its Drivers, and the Role of CIO. Cambridge, MS: Forrester Research, Inc
A city well performing in a forward-looking way in economy, people, governance, mobility, environment, and living, built on the smart combination of endowments and activities of self-decisive, independent and aware citizens	Griffinger, R., Fertner, C., Kramar, H., Kalasek, R., Pichler-Milanovic, N., & Meijers, E. (2007). Smart cities-ranking of european medium-sized cities. Rapport technique, Vienna Centre of Regional Science.
A city striving to make itself "smarter" (more efficient, sustainable, equitable and livable)	NRDC (Website: https://www.nrdc.org/)
A city that monitors and integrates conditions of all of its critical infrastructures, including roads, bridges, tunnels, rails, subways, airports, seaports, communications, water, power, even major buildings, can better optimize its resources, plan its preventive maintenance activities, and monitor security aspects while maximizing services to its citizens	Hall, R.E. (2000) The vision of a smart city. In Proceedings of th 2nd International Life Extension Technology Workshop (Paris, France, Sep 28).
An instrumented, interconnected, and intelligent city	Harrison, C., Eckman, B., Hamilton, R., Hartswick, P., Kalagnanam, J., Paraszczak, J., & Williams, P. (2010). Foundations for smarter cities. IBM Journal of Research and Development, 54(4), 1-16.
A city that gives inspiration, shares culture, knowledge, and life, a city that motivates its inhabitants to create and flourish in their own lives	Rios, P. (2012). Creating "The Smart City" (Doctoral dissertation).
A city where the ICT strengthen the freedom of speech and the accessibility to public information and services	Partridge, H. L. (2004). Developing a human perspective to the digital divide in the "smart city". The proceedings of the biennal company of the Australian Library and Information Association

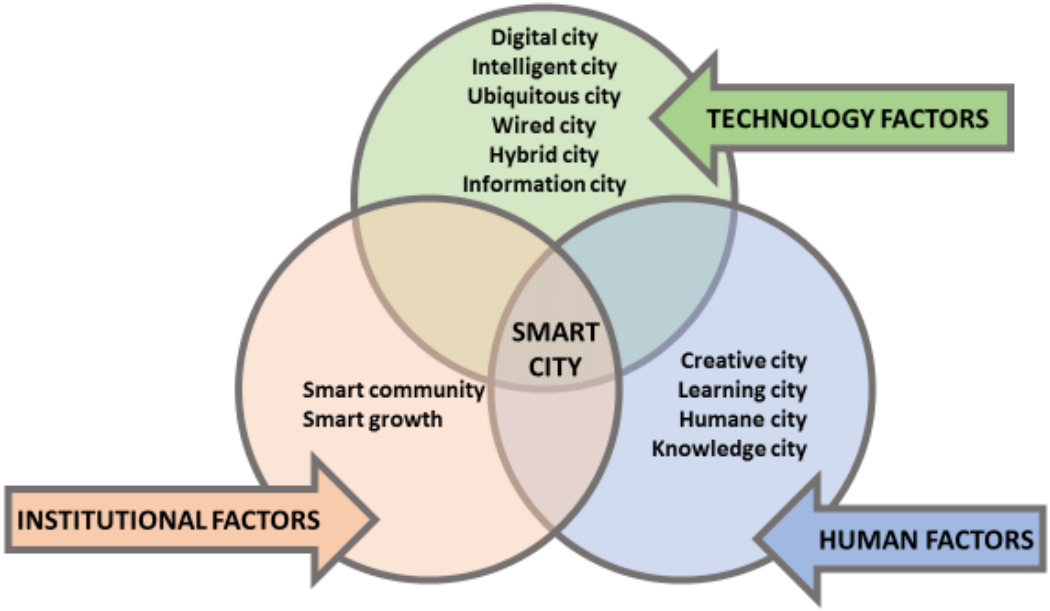
Source: Adaptation from Nam and Pardo (2011)

This is the "smart era" (Lyons, 2016), with a great amount of devices around are so-called "smart" but the real smartness is achieving welfare and avoiding inequalities, exclusion and poverty. "Intelligent Communities are those which have –whether through crisis or foresight– come to understand the enormous challenges of the Broadband Economy, and

have taken conscious steps to create an economy capable of prospering in it" (Intelligent Community Forum)[13].

There are some opinions about the origin of the concept of smart city Gabrys (2014) stated that the germen of this kind of cities began to appear in urban development plans from the 1980s, but there is no a common agreement about this point. In addition, there is not a clear conceptual framework for the smart cities. "The label smart city is a fuzzy concept and is used in ways that are not always consistent (Figure 4-3) (Hollands, 2008; Nam and Pardo, 2011).

Figure 4-3. Fundamental components of a smart city



Source: Adapted from Nam and Pardo (2011)

In this paper, summing up, the smart city is understood as an inclusive space for each and every one to achieve their own options, within the framework of sustainable development, where institutions boost information and technology environments which help to achieve

[13] The Intelligent Community Forum is a global network with a think tank at its center. It connects hundreds of cities and regions on five continents for collaboration on economic development and for exchange of expertise and information that drives progress. Through this network, ICF researches how Intelligent Communities use information and communications technology to build inclusive prosperity, solve social problems and enrich their quality of life in our connected century. (see http://www.intelligentcommunity.org/what_is_an_intelligent_community)

the highest individual and social well-being. Then, everyone is able to achieve his or her best option to live.

Some nuances should be made on the concept of smart city, particularly about the concept of sustainable city. Sometimes such identification is not so clear and some additional investigation in this field should be done (Bibri and Krogstie, 2017). Taking account the systematic perspective on and the universal character of sustainability, it is necessary to define a holistic and shared model of the smart sustainable city. In addition, it is important to explain its relation to inclusive societies for all, because it is the pillar for a real sustainable development (Novo-Corti et al., 2015). Then, these cities face the challenge of combining competitiveness and sustainable urban development simultaneously. Despite the great importance of technological dimension, the more important dimension of the concept of smart city is improving wellbeing for all its inhabitants. The intellectual capital and the social capital are a fundamental pillar for smart cities, then they are engaged on developing its human potential by means of promoting education and get a more skilled workers and that is why these cities has better educated people in a more better endowed labor market, because of these more skilled workers (Glaeser and Berry, 2006). Then the conjunction of knowledge, education and ICTs skills become key factors for analyzing all issues related to smart cities.

In difficult times for economy, the response of smart cities, reinforcing social cohesion becomes essential. One of the population sectors more affected by the economic crisis are the youth (Scarpetta, Sonnet & Manfredi, 2010). Their opportunities were diminished due to the global economic situation and some of them has to emigrate, others still remains unemployed and all of them are victims of this situation, that, at the moment of writing this paper (2017) seems to be changing. Tackle youth unemployment as one goal for smart cities (Monzon, 2015). This goal could be achieved by means of promoting ICTs informal courses to increase youth ICT skills on computers and internet. One key feature of smart cities is to lead the rising of new spaces and workplace positions which are an advantage for the youngest who have to previously acquire those skills for offering their workforce in this new positions (López-Arranz, 2017).

In this paper, the youth employment from 15 to 24 years in European Union is analyzed related to their ICTs knowledge. In the first section, the main concepts and hypotheses are

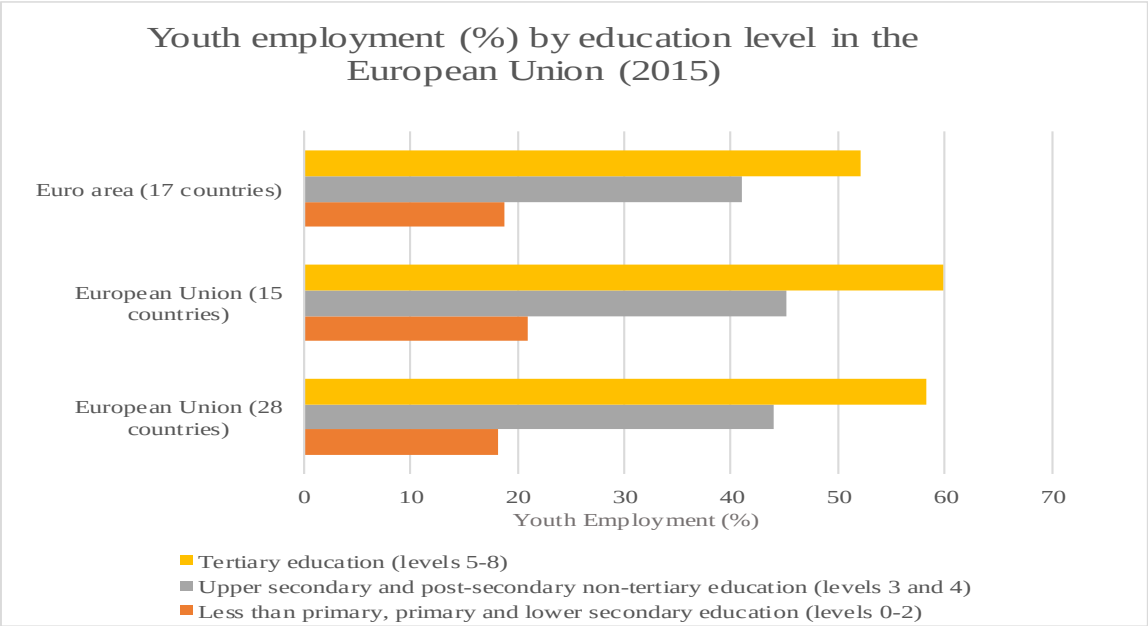
shown. In the second one, the method is explained and in the third the results and discussion are shown. The last section summarizes some conclusions and provides some reflections that may support policy makers in their decision making process.

2. Labor market and smart ICTs competences of youth 15-24 in the EU

The main trends of the new labor structure in rent years was analyzed by Castells, (2011), who indicates that the youth labor possibilities will be in a dual labor market context, which is characterized, on the one hand by its growing flexibility of labor as well as a smaller portion of long-term employed workers, who will have an unpredictable career path, then, the youth will face a more flexible and insecure context. But, on the other hand, there will be a simultaneous growth of highly educated occupations and low-skill jobs; these workers will be the educated knowledge workers so valuable for their companies, that will become the often referred to as ‘‘talent’’ (Castells, 2011). Then two types of workers will appear the ‘‘self-programmable labor’’ and ‘‘generic labor’’, as Castells (2011) labeled. Young people should, therefore, be aware of the importance of acquiring cross-cutting ICT skills, as it is a key issue for employability. In this paper the employment of youth between 15 and 24 years in the European Union is analyzed in relation with the educational level and their skills on computers and internet. Figure 4-4 shows the employment level attending educational level for youth for Euro Area, EU-15 and EU-28 countries as a percentage of people, related to their reference age sector. For all countries conglomerates the higher is the education level, the higher is the employment. Then, employability is narrowly related to education (López-Arranz, 2017). In addition, these possibilities are related to the requirements of the companies (Rumberger, 1981). In a smart city, the enhancing of ICTs extent and use will need an entrepreneurial context ready to face this challenge and, then skilled workers are needed. In addition, a smarter city could help to avoid people involuntary migration flows (Visvizi, Mazzucelli & Lytras, 2017).

Some information on youth employment and ICTs skills for conglomerates of countries in the European Union are provided, respectively, on Figure 4-4 and Figure 4-5.

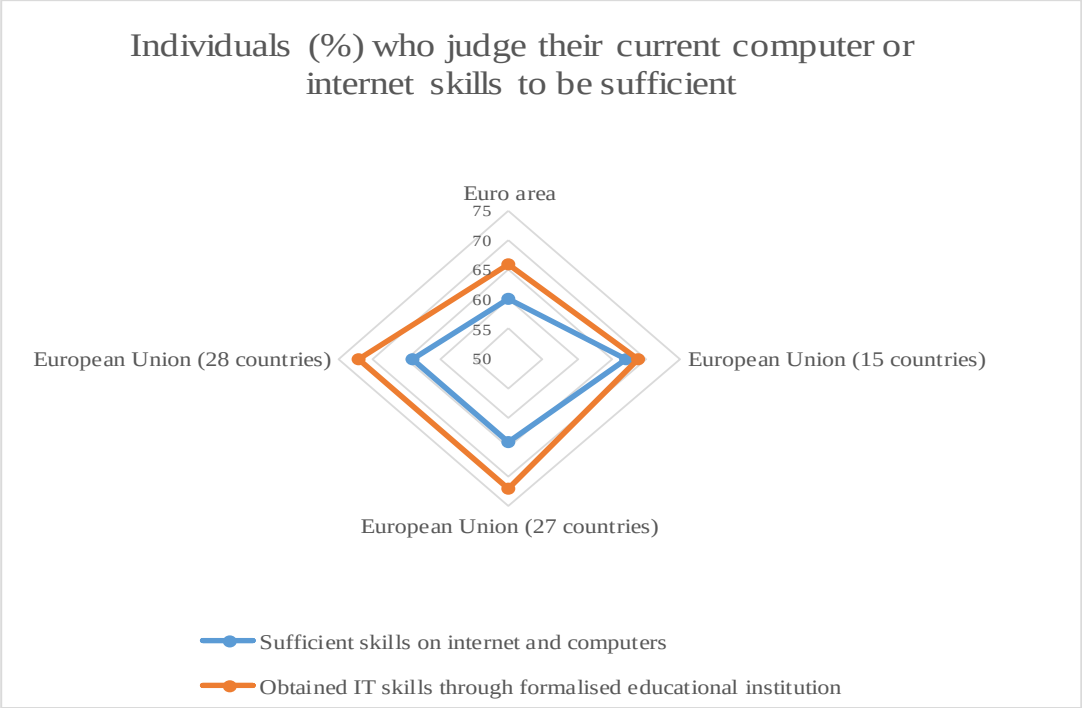
Figure 4-4. Youth employment (15-24 years) by education level in the European Union (2015)



Source: own elaboration from EUROSTAT data

Together with traditional education at colleges and universities, there is another source of skills, which is related to informal education. The informal education is related to the educative flexible processes with a not pre-established time, capable of adapting to particular interest (Dib, 1988), it involves any activity pursuing of understanding, knowledge or skill outside the curricula of educational institutions (Livingstone, 1999). This source of skills is particularly interesting for these subjects belonging to the area of the IT. In the information era, these requirements are changing so fast that sometimes the traditional education environments can provide this knowledge (Brynjolfsson and McAfee, 2012). On the other hand, the "learning by doing" is a key factor for acquiring the skills on ICTs and computers (Schugurensky, 2000). Figure 4-5 shows the Eurostat data for youth between 15 and 24 years old according to their self-assessment of their internet and computer skills and their IT skills obtained through a formalized educational institution.

Figure 4-5. Individuals (%) who judge their current computer or internet skills to be sufficient if they were to look for a job or change job within a year and who have obtained IT skills through formalized educational institution (school, college, university, etc.), (data 2011). People aged between 15 and 24 years



Source: own elaboration from EUROSTAT data

These two indicators shown lower levels for the Euro area, what can be interpreted in two different ways: or the youth are aware about their lack of IT skills (then it is a sign of that youth see the necessity of improving) or that the young people into the Euro area really are less skilled. Anyway, there are some differences between European countries that justify the comparative analysis. Youth employment rates are highest in the European Unión (15 countries) for all educational levels, and the lower is the Euro area (17 countries). For the whole youth these rates are 41 %, 45.2% and 43.9% for Euro area (17 countries), European Union (15 countries), and European Union (28 countries), respectively. The European Union (15 countries): Belgium, France, Germany, Italy, Luxembourg, Netherlands, Denmark, Ireland, United Kingdom, Greece, Portugal, Spain, Austria, Finland, Sweden). With the expansion to new countries (Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia, Bulgaria, Romania and Croatia) the European Union has 28 Member States. The euro area was created in 1999. The 11 founding states were Germany, Austria, Belgium, Spain, Finland, France, Ireland, Italy, Luxembourg, the Netherlands and Portugal. Since then, Greece (2001), Slovenia (2007),

Malta and Cyprus (2008), Slovakia (2009), Estonia (2011), Latvia, (2014) and Lithuania (2015) have been incorporated. The 17 states that make up the euro area are Austria, Belgium, Cyprus, Czech Republic, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovenia and Spain. The Youth Employment rates are reflecting the different situation in the Euro area, mainly due to the effects of the economic crisis in this area. As can be seen by analyzing the situation in Greece, Portugal, Italy and Spain. These countries have suffered heavily from the impact of the economic crisis on their overall economy and on their employment rates in particular.

OECD states that the Countries with well established Vocational and Educational Training (VET) and apprenticeship programs have been more effective in holding the line on youth unemployment (OECD, 2016). It is true that there are some opinions pointing out to the employment destruction due to the new innovative production processes and the technological changes, but other opinions are just pointing out to the opposite direction (Dachs et al., 2017), on the other hand, nobody can be sure about the direction of changes in the future (Biagi and Falk, 2017). Nevertheless, to be willing to accept the technological changes and being proactive to getting skills for facing them will help to improve both personal and social positions in near future. The changes in the smart cities are a proof of this willingness on society and this is a great step to boost the citizenship attitudes.

This paper focuses on the assessment of the youth situation in the European Union in the framework of smart cities and EU-2020 goals, more specifically; this paper analyzes their competences on ICTs and tries to find casual relations between their ICTs skills and their employability in the context of the European Unión. Differences between the groups of countries are analyzed. Two main research questions are specified and some hypothesis for helping to answering these research questions are specified:

Research question 1 (RQ1): Are there differences between the groups of countries of the European Union according the youth adaptation to the digital world?

H-1-1: There are differences between the Eurozone and the other European countries on awareness of the importance of IT for youth between 15 and 24 years

H-1-2: There are differences between the Eurozone and the other European countries on the ICTs learning for youth between 15 and 24 years

H-1-3: There are differences between the Eurozone and the other European countries on the internet use for youth between 15 and 24 years

H-1-4: There are differences between the Eurozone and the other European countries on the computers use for youth between 15 and 24 years

H-1-5: There are differences between the Eurozone and the other European countries on the IT skills through learning for youth between 15 and 24 years

Research question 2 (RQ2): Is there a casual relation between the Computers skills and the employability for youth 15-24 in the EU?

H-2-1: The Computers skills is not significant for explaining the youth 15-24 employability in the EU

3. Method

The smart cities promote a smart, inclusive and sustainable development and it requires a sustainable labor market. This paper analyzes the youth employability focusing on their skills on computers, in the framework of the European Union. The research questions are crucial for the knowledge of the geography of smart cities in Europe and the youth digital skills for the labor market. The research question 1 (RQ1: Are there differences between the groups of countries of the European Union according to the youth adaptation to the digital world?), as well as the research question 2 (RQ2: Is there a causal relation between the Computers skills and the employability for youth 15-24 in the EU?).

The main innovation of this work is to test the influence of the capacities the young people computers skills on their possibilities of obtaining a job, in the European Union framework. The results achieved in this research can help managers of social and economic policies in decision-making. On the other hand, these results are especially relevant in the context of an intelligent city, where designing actions that encourage young people to increase their training in computers are essential. In addition, the conclusions of this work can be useful in promoting the development of a sustainable labor market, in the context of the objectives of smart, inclusive and sustainable growth in which smart cities are developed.

For testing the RQ1 of ICTs a means comparison between the Eurozone and the other countries in the EU was conducted, as well as the previous Levene test for groups' equal

variances. Additionally, a Structural Equation Modelling was the method applied for solving the Research question 2 (RQ2). This method is the adequate in this situation, because it is intended to assess a causal relation by means of a regression analysis with one dependent variable (the Computers skills) and other independent variable (The Computes Skills): this is the so-called "structural model". These variables are not easy to measure, because they are "constructs" or "latent variables", which are composited or constructed by means of several indicators, the relation between the latent and observable variables is in Table 4-9.

SEMs are very valuable in this type of analysis, especially in two aspects. On the one hand, they allow to working with variables that cannot be observed directly, in this research this method is very appreciated to construct the variable "Computers Skills" because it is a multidimensional variable composed of very different aspects. Thus, in this work, this multidimensional variable can be "constructed" by its various components. On the other hand, the SEM methodology allows explaining the causal relationships between these latent variables. In our work, it allows us to answer research question 2 (RQ2) which try to test the causal relationship between the abilities of young people in computers and their employability.

The proposed method has to be analyzed taking account three main issues: the global fit of the model, the Structural and the Measure Models. The global fit of the model should be taken account for assessing the model adequateness and it has to give the satisfactory scores to test the global validity of the model. For this measurement, the minimum discrepancy rate (Chi-Squared/df) (Browne, 1982; Browne and Crudeck, 1993), the comparative fit index (CFI) (Bentler, 1980) and the root mean square error of approximation (RMSEA) (Browne and Cudeck, 1993) were analyzed and all results were plenty satisfactory, as can be seen in Table 4-11. In addition, two are the models that should be analyzed: the measurement and the structural ones. The first one explains the causal relations between the latent variables, whilst the second one analyzes the reliability and the internal consistency of the model, by means of the measure of the relation between each construct and its measurable indicators. The most commonly stated are the Cronbach's Alpha(Cronbach, 1951), the rate of composite reliability (Bacon et al., 1995) and the extracted variance (Fornell and Larcker, 1981). The latent variables and their indicators are shown in Table 4-8.

Table 4-8. Latent variables and indicators

Latent Variable	Indicator
Computers Skills	Individuals who judge their current computer or internet skills to be sufficient if they were to look for a job or change job within a year
	Individuals who judge their current computer or internet skills to be sufficient to communicate with relatives, friends, colleagues over the internet
	Individuals who judge their current computer or internet skills to be sufficient to protect their personal data
	Individuals who judge their current computer or internet skills to be sufficient to protect their private computer from virus or other computer infection
Employment	Education attainment level 0-2
	Education attainment level 3-4
	Education attainment level 5-8

Data were obtained from the EUROSTAT (European Union, 2017), from the specific section about "youth" (yth) contained in the database "Population and social conditions". The EUROSTAT criteria is followed in this work for classifying the young people as "youth": they are those people between 15 and 24 years old. All data were updated at the most recent level provided by the European Union Statistics Office. The software was the IBM statistics SPSS 21 and the AMOS 21.

4. Results

For answering the RQ1 a means comparison analysis was undertaken. Previously to the T-test it is necessary to test de equal variances between the groups by means of the Levene Test. The results of the calculation of this test are shown in Table 4-9 and indicate that equal variances should not be assumed, since the null hypothesis is assuming equal variances and the p-value is lower and 0.05, so this null hypothesis should be rejected. In Figure 4-5 is displayed the information about individuals (%) who judge their current computer or internet skills to be sufficient if they were to look for a job or change job within a year and who have obtained ICTs skills through formalized educational institution (school, college, university, etc.), (data 2011). People aged between 15 and 24 years.

The comparison between the Euro area and the other Member States of the EU has shown only differences for one item (see Table 4-9). The previous Levene test was conducted for analyzing the equality of variances, which results indicates that equal variances should not be assumed.

Table 4-9. Means difference test

	Levene test for equal variances		T test for equal means				
	F	**Sig.**	**t**	**DF**	**Sig. (two tiled)**	**Means difference**	**Difference standard error**
Individuals who have obtained IT skills through training courses and adult education centers, on own initiative	9.793	0.004	2.686	25,361	0.013	3.082	1.147

*Equal variances were not assumed

For the item "Individuals who have obtained IT skills through training courses and adult education centers, on own initiative" the means are 6.526 and 3.444, respectively, then the difference is 3.082 and statistic significant (0.01).

For answering the Research Question 2, a Structural Equations Modelling was conducted. The results for the measurement model are summarized on Table 4-10. The measurement model analyzes the consistence of latent variables and their adequate measure, by means of their observable indicators. Then, the factor structure was tested of this model, by means of a confirmatory factor analysis, with the intention of checking the reliability and validity of the measurement scale, previously the factor loadings of all items was checked to proof the required minimum thresholds, which are usually accepted for < 0.5, since all the results exceed these values, then the convergent validity of the scale is expected (Fornell and Larcker, 1981).

Table 4-10. The measurement model: Reliability and internal consistence of the latent variables

Latent Variable	Item	λ	Alpha Cronbach	CR	AVE
Youth Employability	1-2	0.674	0.876	0.685	0.825
	3-4	0.833			
	5-8	0.544			
Youth Computers Skills	Job	0.575	0.933	0.790	0.884
	Communication	0.712			
	Data Protection	0.950			
	Virus Protection	0.922			

To check the reliability and internal consistency of the model, the Cronbach's alpha, rates of composite reliability and variance extracted values were calculated. The reference scores are the next: Alpha ≥ 0.7(Anderson and Gerbing, 1988; Hair et al., 1999), composite reliability (CR) should take scores ≥ 0.5 (Bagozzi and Yi, 1988) for confirming the internal

consistency of constructs; for measuring the accuracy with which the analysis instrument represents the variables, the average variance extracted (AVE) values exceed 0.5 (Hair et al., 1999). Each latent variable's AVE was larger than the squared correlation between each pair of latent variables, thus demonstrating the good discriminant validity of the scale (Fornell and Larcker, 1981).

To analyze the global fit of the model the more common indexes were analyzed, and its reference scores are shown in Table 4-11. Our model has a good or acceptable fitting, according all indexes.

Table 4-11. Goodness of model fitting

Fit index	**Score**	**Reference scores**	
		Good	Acceptable
$\chi 2/df$	1.136	$0 \leq \chi 2/df \leq 2$	$2 \leq \chi 2/df \leq 3$
CFI (Comparative fit index)	0.989	$0.97 \leq NFI \leq 1.00$	$0.95 \leq NFI \leq 0.97$
TLI (The Tucker-Lewis coefficient)	0.982	As close as possible to 1	
NFI (Normed fit index)	0.916	$0.95 \leq NFI \leq 1.00$	$0.90 \leq NFI \leq 0.95$
RMSEA (Root mean square error of approximation)	0.071	$0 \leq RMSEA \leq 0.05$	$0.05 \leq RMSEA \leq 0.10$

The reference values indicates that χ^2 values $1 \leq \chi 2 \leq 2df$ are compatible with an acceptable fitting (Carmines and McIver, 1981). In our model the interval is $1 \leq \chi^2/df = 1.136 \leq 2$. For the comparative fit index, is considered a good adjustment when $0.95 \leq CF \leq 1.00$, and acceptable for $0.94 \leq CF \leq 1.00$, due that the score in this model is 0.989, it is a very good fit. The typical range for TLI lies between zero and one, but it is not limited to that range (Bentler and Bonett, 1980; Bollen, 1989). TLI values close to 1 indicate an acceptable fit. The normed fit index (NFI) indicates a good fitting when $0.95 \leq NFI \leq 1.00$ and acceptable when $0.90 \leq NFI \leq 0.95$ (Bentler and Bonett, 1980; Bollen, 1989), this is the case of this model (0.982). The good and acceptable values for the Root mean square error of approximation (RMSEA) are $0.00 \leq RMSEA \leq 0.05$ and $0.05 \leq RMSEA \leq 0.10$, respectively, in this model the score is 0.071 (Browne and Crudeck, 1993; Steiger and Lind, 1980). Then, it is possible to conclude that, in general terms, the model is suitable for analyzing the proposed problem. Nevertheless, the scale of the fit indices is not always easy to interpret (Bentler and Bonett, 1980).

The structural model results are shown in Table 4-12 and in Figure 4-6. This model is a lineal regression analysis, but can it also contain concatenated effects and loops between variables.

The Employment is explained by the computers skills, which is significant ($p < 0.001$) and the fitted R2 is 0.399, then this model explains the 40 % of the youth employability in basis to their skills on computers.

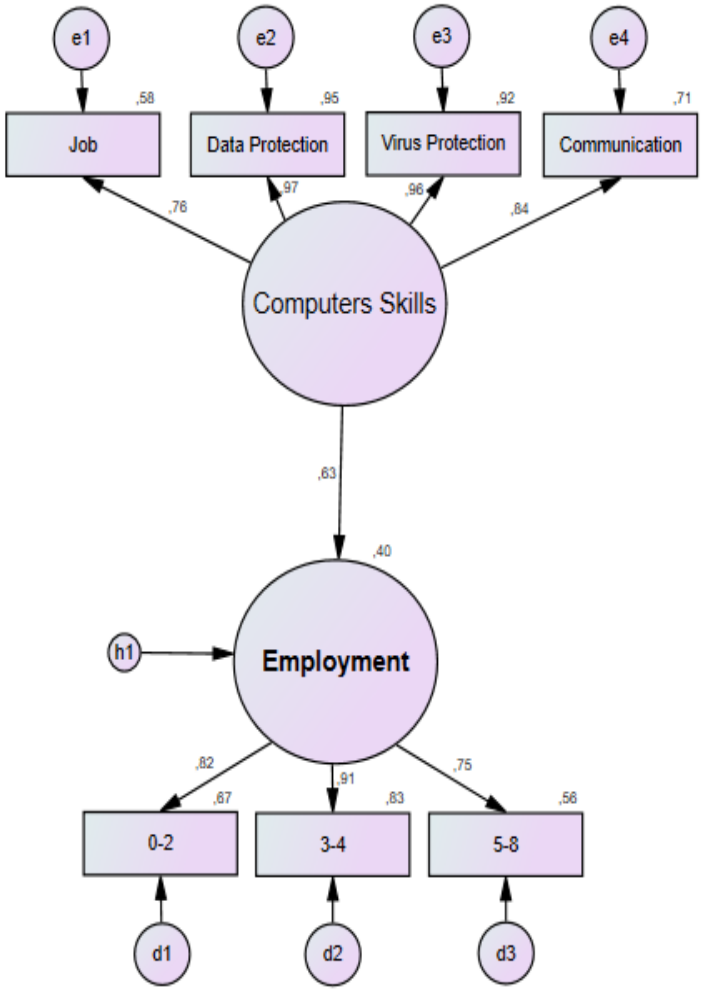
Table 4-12. Results for the structural model

Dependent variable	Independent variable	Estimator	Standard Estimator	Significance	R^2 fitted
Youth Employability	Youth Computers Skills	0.529	0.632	***	0.399

*** $p < 0.001$

The Employment is explained by the computers skills, which is significant ($p < 0.001$) and the fitted R2 is 0.399, then this model explains the 40 % of the youth employability in basis to their skills on computers.

Figure 4-6. Results



5. Discussion and conclusions

The youth living in the Euro Area countries are sensible about the importance being updated on IT knowledge, because the means comparison results indicates that there are no difference on formal learning and other ways of training, nevertheless there is statistic significant difference on the item "Individuals who have obtained IT skills through training courses and adult education centers, on own initiative", that is to say, that for the same level of knowledge, they are attending more courser by their own initiative. The means are 6.526 and 3.444, respectively, what indicates that youth in the Euro Area there are more aware on the necessity of training, since they are demanding this training courses on own initiative.

The answer to RQ1, taking account he tested hypotheses, shown in Table 4-13. Hypotheses results. The results indicate that there is an essential difference between the Euro Area and the other EU countries (tested on H-1-5).

Table 4-13. Hypotheses results

RQ	Hypotheses	Result
RQ-1	H-1-1: There are differences between the Eurozone and the other European countries on awareness of the importance of IT for youth between 15 and 24 years	Rejected
	H-1-2: There are differences between the Eurozone and the other European countries on the ICTs learning for youth between 15 and 24 years	Rejected
	H-1-3: There are differences between the Eurozone and the other European countries on the internet use for youth between 15 and 24 years	Rejected
	H-1-4: There are differences between the Eurozone and the other European countries on the computers use for youth between 15 and 24 years	Rejected
	H-1-5: There are differences between the Eurozone and the other European countries on the IT skills through learning for youth between 15 and 24 years	Accepted
RQ-2	H-2-1: The Computers skills is not significant for explaining the youth 15-24 employability in the EU	Rejected

We conclude that five of the six tested hypotheses are rejected; that is to say, H1.6, is the only accepted hypothesis. The one that focuses on awareness of the importance of ICTs skills, and it has been proven in literature (López-Arranz, 2017) to be a key factor for employability in the context of new workplaces arising in the smart cities.

About the Research Question 2 (RQ-2) this structural modelling has proved that the skills on computers is a relevant factor to explain youth employability in the European Union and the H-2-1 should be rejected.

To summarize, the main conclusion of this work is that the smart cities can provide some new workplaces possibilities for those who are skilled to develop the requirements of these positions. The youth awareness of the importance of Information Technologies in general terms, and the long life learning, in particular, will be the most suitable for getting these jobs by means of being more qualified and then with a higher employability level. Boosting these educational skills among youth is recommended to policy makers to improve the youth employment levels and to provide the qualified workforce to those companies involved in the smart cities support and promotion.

Smart cities are essentially inclusive cities that promote sustainable development in a broad sense. This justified their commitment to developing policies to improve youth ICT skills. These actions not only favor this particular group, but also the labor market as a whole and the economy in general. In short, this is one more way for smart cities to contribute to the smart and sustainable development and growth.

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SUSTAINABLE DEVELOPMENT, POVERTY AND RISK OF EXCLUSION FOR YOUNG PEOPLE IN THE EUROPEAN UNION: THE CASE OF NEETs

5. Sustainable development, poverty and risk of exclusion for young people in the European Union: the case of NEETs

PUBLICATION 3: Sustainable development, poverty and risk of exclusion for young people in the European Union: the case of NEETs

sustainability

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Article

Sustainable Development, Poverty, and Risk of Exclusion for Young People in the European Union: The Case of NEETs

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Received: 25 October 2018; Accepted: 6 December 2018; Published: 10 December 2018

Abstract: The difficulties of access to the labor market remains in the post-crisis period, particularly for younger people and for those countries more affected by the crisis. The economic conditions with the precariousness of the labor market and higher unemployment rates for youth, draws a scenario where the risk of poverty and social exclusion could influence young people and discourage them from social and economic participation, and thus the number of young people not in employment, education, or training (NEETs) will increase. The sustainable development in general and the social sustainability in particular needs to solve this important issue to get a balanced and fair social and economic scenario. In this work, the influence of socio economic variables related to the level of prosperity of the country and social protection as well as the risk of poverty and social exclusion on young NEETs is evaluated based on the EUROSTAT data for the year 2016, for young people. The method was a structural equations model and the results confirm that the key important factors for explaining the situation of the NEETs' are more related to poverty and exclusion than to the economic environment. The main conclusion from these results is the importance of implementing some inclusive actions to prevent an increase in the number of young NEETs, and boosting, in this way, a more balanced and sustainable society.

Keywords: NEETs; youth unemployment; risk of poverty and social exclusion

1. Introduction

Achieving sustainable development worldwide requires an equitable and balanced social and economic environment. The people who are currently looking for their first job are mainly young people known as "millennials". These young people are facing their access to the labor market under very special conditions. On the one hand, the economic situation, which has just emerged from a severe economic crisis; on the other hand, the changing dynamics of the labor market, which requires workers with high levels of training and mastery of information and communication technologies (ICTs). Then, sustainable and balanced development should be understood in the context of a smart growth, which is essential for developing an economy based on knowledge and innovation, and a connected digital single market, which can boost growth in Europe and generate multiple new jobs for younger job seekers together with a lively knowledge-based society [1]. In these circumstances, some young people face barriers that are very difficult to overcome and they become discouraged. This discouragement can affect both the continuation of studies, enrollment in training, and/or in the search for a job. The economic situation of the country and the social support are factors that influence the youth discouragement and, depending on it, young people could become part of the group known as

Sustainable development, poverty and risk of exclusion for young people in the European Union: the case of NEETs

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Abstract

The difficulties of access to the labor market remains in the post-crisis period, particularly for younger people and for those countries harder affected by the crisis. The economic conditions with the precariousness of the labor market, with higher unemployment taxes for youth, draws a scenario where the risk of poverty and social exclusion could influence the young people and discourage them of social and economic participation, then the number of young people not in employment, education or training (NEETs) will increase. The sustainable development in general and the social sustainability in particular needs to solve this important issue in order to get a balanced and fair social and economic scenario. In this work it is analyzed the influence of socio economic variables, related to the level of prosperity of the country and of social protection as well as the risk of poverty and social exclusion on young NEETs, in basis to the EUROSTAT data for the year 2016 for young people. The method was a structural equations model and the results confirm that the key important factors for explaining the situation of the NEETs' are more related to the poverty and exclusion than to the economic environment. The main conclusion achieved form these results is the importance of implementing some inclusive actions to prevent the increasing of the number of young NEETs and boosting, in this way, a more balanced and sustainable society.

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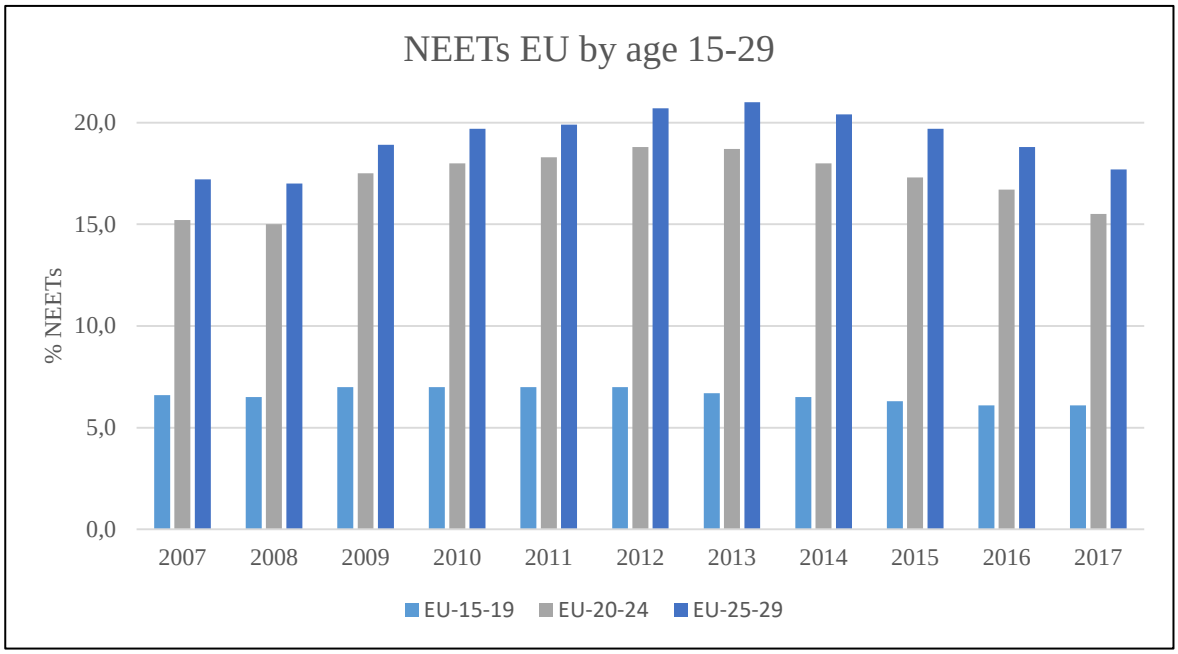
1. Introduction

Achieving sustainable development worldwide requires an equitable and balanced social and economic environment. The people who are currently looking for their first job are mainly young people known as "millennials". These young people are facing their access to the labor market under very special conditions. On the one hand, the economic situation, which has just emerged from a severe economic crisis; on the other hand, the changing dynamics of labor market, which requires workers with high levels of training and mastery of Information and Communication Technologies (ICTs). Then, the sustainable and balanced development should be understood in the context of a smart growth, which is essential for developing an economy based on knowledge and innovation and connected digital single market, and which can boost growth in Europe and generating multiple new jobs for younger job seekers together with a lively knowledge-based society (Armeanu, Vintilă, & Gherghina, 2017). In these circumstances, some young people face barriers that are very difficult to overcome and they become discouraged. This discouragement can affect both the continuation of studies, enrolment on training and/or in the search for a job. The economic situation of the country and the social support are factors that influences the youth discouragement and, depending on it, young people could become part of the group known as NEETs (Neither in employment nor in education and training). The negative consequences of youth unemployment affect not only individuals, but also the whole society (Chen, 2011).

The economic crisis, which began in the financial sector in August 2007 and had its transformation into the global economic crisis with the stock market crash of September 2008, caused by the fall of Lehman Brothers, highlighted the weaknesses of the labor model in certain European countries, particularly those most affected by this crisis, whose intensity is unprecedented since the Great Depression of 1929. Some groups, among them youth, were more vulnerable. Although the evolution of the youth population between 1997 and 2017 has experienced a growth of 139 million people, at the same time as the youth workforce was reduced by 34.9 million people. The overall participation rate of the youth workforce has decreased over the past 20 years from 55.0 percent to 45.7 percent and in the OECD countries, almost 18 percent of unemployed youth have been without work for a year or more (ILO, 2017).

At the Luxembourg Summit (1997), the European Employment Strategy was adopted. Its main objective was to achieve progress over a five-year period, especially with regard to youth unemployment (Ruesga Benito, Pérez Ortiz, & da Silva Bichara, 2003), this issue continues to be the main concern, as it is reflected in the importance given to it in the European Agenda 2030. Moreover, if the amount of NEETs is high, as Quintano, Mazzocchi and Rocca (2008) (Quintano, Mazzocchi, & Rocca, 2018) stated for the case of Italy, it could represent a social alarming, because it could become an obstacle to economic growth, hampering productivity and competitiveness for the whole country, especially when this condition persists for a prolonged period [4]. The rate for young people neither in employment nor in education or training (NEETs) is closely linked to economic performance and the business cycle, but also related to labor policies and social protection. The NEETs rates in the EU-28 in 2016 were 6.1% for people aged 15-19, 16.7 % for those aged 20–24 and 18.8 % for those aged 25–29. Figure 5-1 reflects the importance and evolution of the percentages of NEETs. It is shown that there is a great difference attending the group of age, and that for the youth from 25 to 29 are this is an essential issue, since for 2013 and 2014 the incidence was 21.6 and 21.2 percent, respectively.

Figure 5-1. NEETs in the European Union

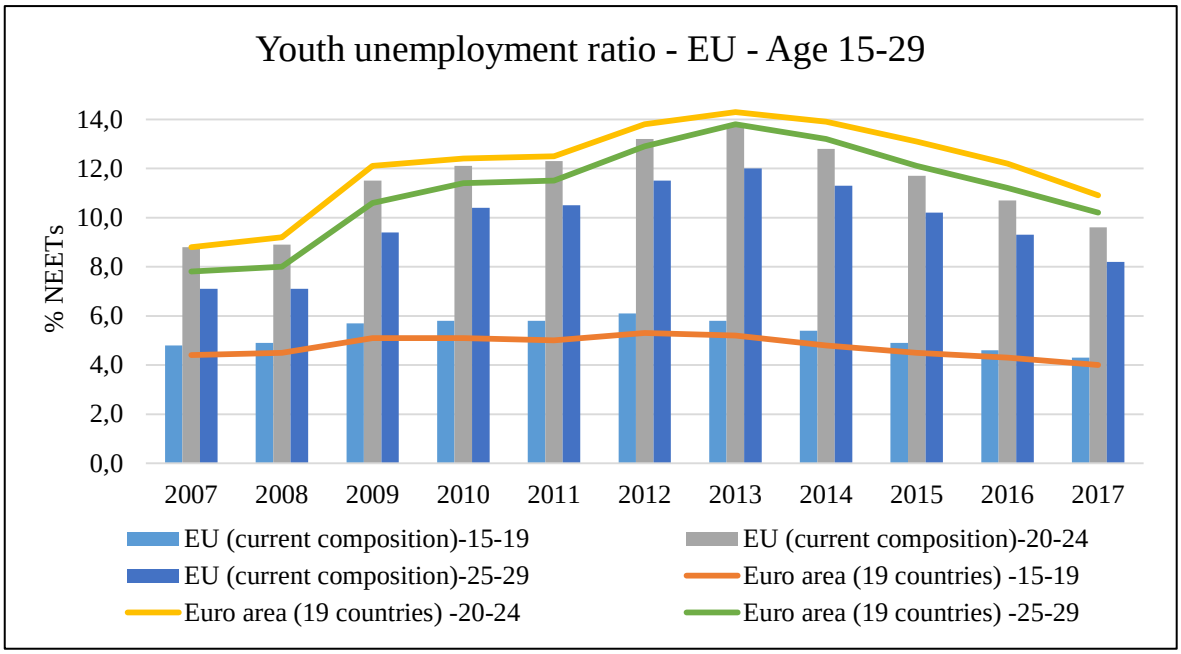


Source: Own elaboration from EUROSTAT data [yth_empl_160]

The economic crisis intensified young people's situation, increasing social inequalities (Quintano et al., 2018), since in the crisis economic context there is a risk of the emergence

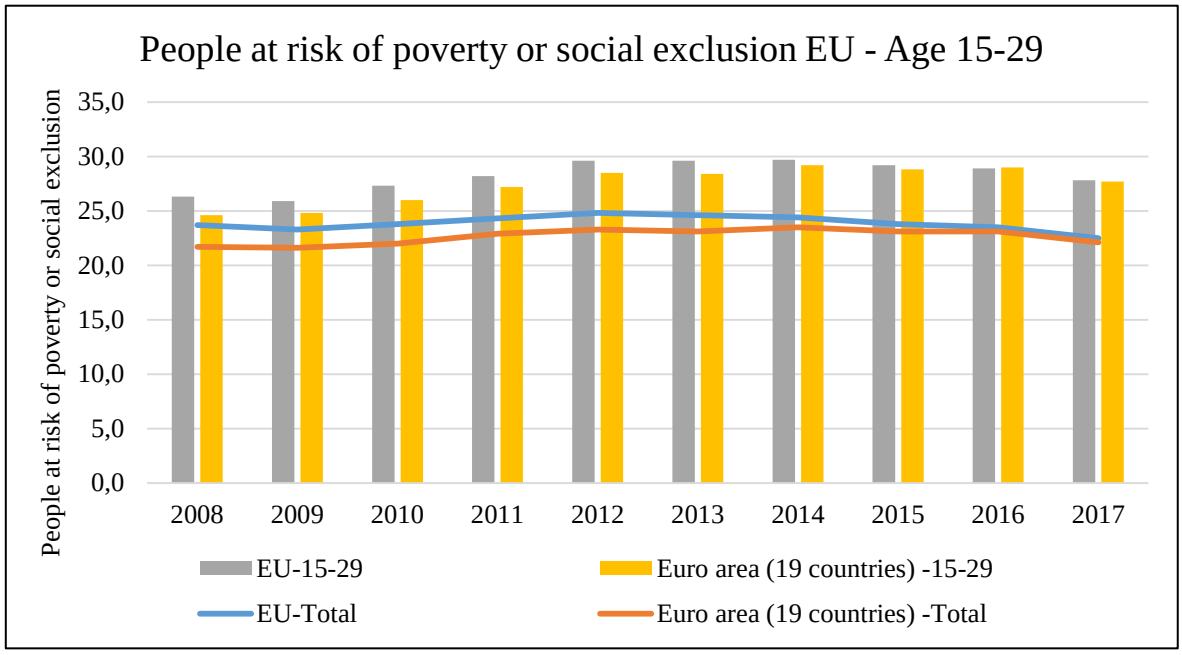
'the precariat' as a new social class, which involves all those without work or precarious jobs, sometimes highly qualified individuals, who are affected by the environment, which has not lead them developing their career as they would have liked (Aceleanu, Serban, & Burghelea, 2015; Standing, 2011). The unemployment taxes among youth (15-24 years) raised quickly, as it is shown in Figure 5-2. The high unemployment levels for youth are one important factor to explain the risk of exclusion and why it is higher for youth than for the whole population. Taking account all these circumstances there is an important risk of exclusion for youth, but is seems to be higher for the NEETs, as it is proved by the data related to the EU, as it is shown in Figure 5-3, and an overview of the total population by age in Figure 5-4.

Figure 5-2. Youth unemployment in the European Union



Source: Own elaboration from EUROSTAT data [yth_empl_140]

Figure 5-3. People at risk of exclusion



Source: Own elaboration from data of EUROSTAT [ilc_peps01]

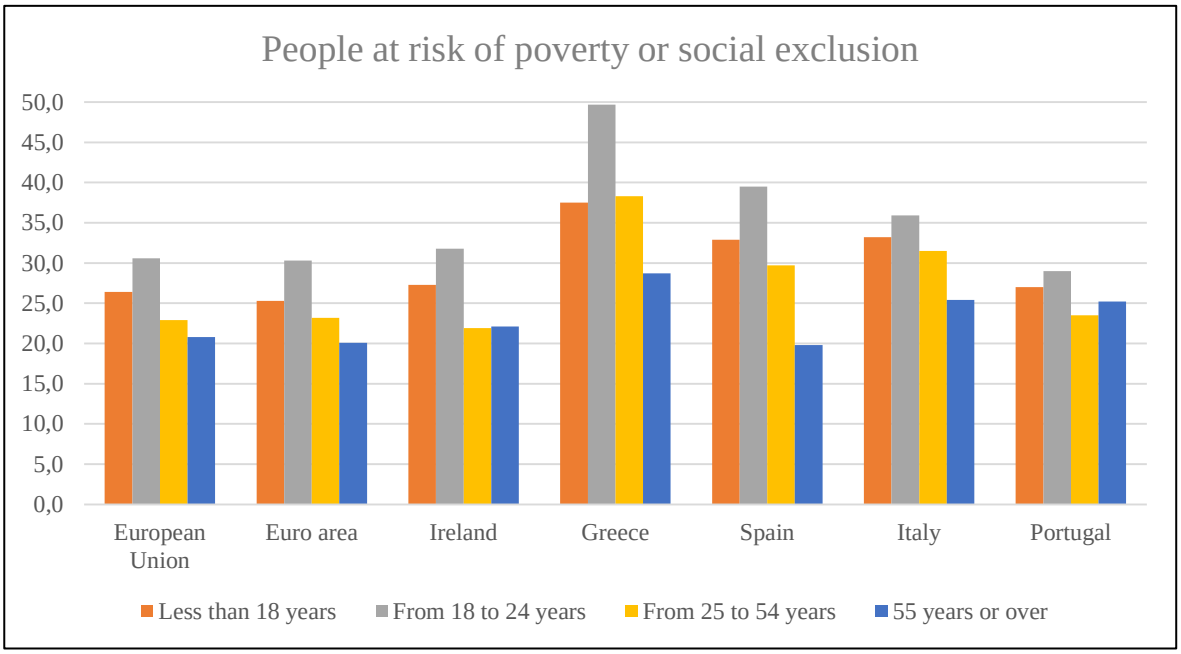
Academic literature points to the economic situation (Nestic & Tomic, 2018; Sergi, Cefalo, & Kazepov, 2018) and the risk of exclusion (Bäckman & Nilsson, 2016; Quintano et al., 2018) as important factor s interacting (Järvinen & Rinne, 2010; Robles, Funes Rivas, & Robles, 2016) to influence the youth's discouraging and the possible increase of the number of NEETs. Trying to search the link among these three variables, in general, and trying to identify a causal relation becomes the main objective of this work. There is a growing body of academic research on sustainable development and risk of exclusion for young people, focusing on a wide range of factors of exclusion and its multiple factors, from health and education to labor market access (Ellison, 2017; Hamalainen, Hämäläinen, & Matikainen, 2018; Torsheim et al., 2018).

The interest of our research and its main contribution to literature relays on two main points: on the one hand establishing and quantifying a causal relation between the number of NEETs and the economic environmental conditions as well as their risk of poverty and social exclusion; on the other hand to prove that the significant variable to explain the number of NEETs is the risk of poverty and social exclusion, whilst the economic factors become less relevant (data of European Union Statistics Office - EUROSTAT have been used).

The main goal of this paper is analyzing the influence of the socioeconomic environment and the risk of vulnerability as explanatory variables for the incidence of the NEETs phenomenon in the context of the European Union, through a quantitative analysis, which uses the data provided by the statistical office of the European Union. (EUROSTAT), for the year 2016.

The structure of this paper is as follows: after the statement of the importance of the analyzed issue, as well as its contextualization, shown in section 1. The influence of the economic environment and the risk of vulnerability as meaningful variables for the explanation of the youth inclusion on the labor market and to avoid their risk of becoming a NEET; the interrelation among the explained variables as well as the causal model proposed in this research are stated in section 2. The methodological approach is explained in section 3. The results are given in section 4 and its discussion and reflections are presented in section 5, finally, section 6 is dedicated to the presentation of the conclusions, together with some policy recommendations. In this section, some limitations of this study are shown as well as some lines for further research.

Figure 5-4. The risk of poverty and social exclusion in the European Union in 2016.



Source: Own elaboration from Eurostat [ilc_peps01]

2. The economic environment, the vulnerability and the young people

The special situation experienced by young people currently seeking their first job, due to the economic crisis, has also been influenced by the dominant public policies at that time, in particular, social, labor, educational and health policies are very relevant, because they present a specific environment, which could lead to a situation of labor vulnerability. This occurs both in the case of those who find employment, because it is a job of poor quality, and in the case that they do not find it, because they could fall into discouragement. In this sense, the academic literature points out that the incidence of the number of NEETs is related to the socio-economic environment (Aceleanu et al., 2015; Quintano et al., 2018) and also with the situation of social vulnerability (de Souza Paulino & Bendassolli, 2018; Vancea & Utzet, 2018; Zudina, 2018), mainly represented through the risk of poverty and social exclusion. Hence the importance of analyzing the vulnerability of young people in their access to the labor market, taking into account the socio-economic environment in which they have developed. It is a complex situation in which the risk of poverty, social exclusion and involvement in society are present (Kieselbach, 2003). It has been proved that inclusion avoids discouragement and the possibility of becoming a NEET; Robles, Funes Rivas and Robles (Robles et al., 2016) have proved both theoretical and empirically that engagement with society can potentially reduce the precarious economic situation, as well as lack of education and relation, being a way to drive young inactive people to be an integrated, active and include citizen.

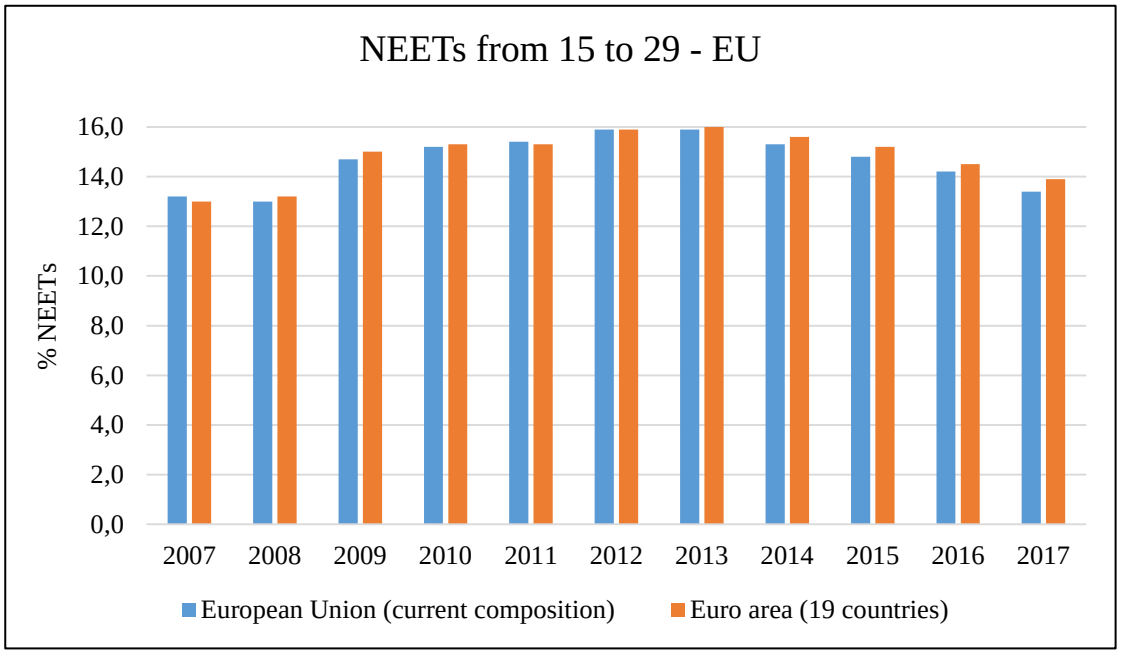
Additionally, it is worth highlighting that this problem goes beyond a specific group to become a social problem that has an important projection in the future (Chen, 2011), since The probability of finding a permanent job for those young people who previously were in the NEET position is lower and they assume a higher risk of precarious employment and other social issues, which even could come to a lack of trust in social institutions (Zudina, 2018). In all the countries of the European Union, the NEETs register high unemployment rates and, many of them, when finishing the basic or compulsory education, they do not continue studying either. This inactivity leads to a delay in emancipation, family dependence, lack of integration in society and can lead to psychological problems, with the ultimate effect of a process of social exclusion (Zudina, 2018). It is like a wound that will heal but, perhaps, accompany them throughout life. In sociology it is called the "scar effect" which points to the fact that we have generations ahead that will be distrustful and without

great motivation neither for the work world nor for other issues. By not having many expectations, they survive reality in the way that they believe that the least harm can be done to them. For those who have had a previous job, this scar effect could be reduced if they have received an unemployment benefit (Gangl, 2004), but this does not happen if they are looking for their first job, as it is, in general, the case that concerns this research.

2.1. The NEETs distribution

The economic and social situation of many countries has been so much affected that a decade later they have barely managed to recover the levels of wellbeing prior to the economic crisis. This situation has particularly hurt the countries of the south of the European Union, belonging to the euro area, which have not been able to use the mechanisms of monetary policy to deal with the crisis situation. This is the case of Greece, Portugal, Spain and Italy (Quintano et al., 2018; Ruesga Benito, Sell, Pérez Ortiz, & Pérez Trujillo, 2018; Vancea & Utzet, 2018). The evolution of the incidence of NEETs (provided in Figure 5-5) seems to remain equal across time and it appears with a quite similar patron both for the whole EU and for the Euro Area.The unequal sectorial result of the dynamics of labor supply and demand became in an imbalance in the labor market that has worsened in recent decades. The significant presence of very intensive sectors in unskilled work (construction or tourism) explain the high volatility of employment, as is was seen in some southern European countries, for example in Spain (Ruesga Benito, Lasierra, Pérez Ortiz, Pérez Trujillo, & Silva Bichara, 2014; Vancea & Utzet, 2018). But this situation in the labor market was similar to what happened in other areas of the economy. Specifically, the general environment, due to the policies adopted in those countries to deal with the economic situation, which have been accompanied by restrictions on public spending on fundamental aspects such as health (Picatoste, Ruesga-Benito, & González-Laxe, 2018) and education (Novo-Corti, Badea, Tirca, & Aceleanu, 2018). As a result, some social groups, like today's youth, who were in their childhood or adolescence at the time of applying these policies and, therefore, have been affected by them and then they become at risk of being part of the NEETs group. It is important trying to avoid this risk, since the NEETs "are exposed to a high risk of poverty and social exclusion, as they cannot improve their skills and competences, losing competitiveness" (Quintano et al., 2018).

Figure 5-5. NEETs in the European Union.



Source: Own elaboration from EUROSTAT data [yth_empl_160]

The main previous research on causes for becoming a NEET are, then, linked to the Economic and threat of vulnerability (Järvinen & Rinne, 2010; Robles et al., 2016). For the proposal of this paper, the economic environment is understood not only form wealth, income or production, but from a perspective of the population participation on the wealth of their country. About the threat of vulnerability the risks of poverty or social exclusion is a good indicator. According EUROSTAT; People at risk of poverty or social exclusion (AROPE), refers to persons who are either at risk of poverty, or severely materially deprived or living in a household with a very low work intensity (those persons are only counted once even if they are present in several sub-indicators). The AROPE rate, the share of the total population, which is at risk of poverty or social exclusion, is the headline indicator to monitor the EU 2020 Strategy poverty target.

The risk of poverty and exclusion in the European Union is higher the younger is the population, as it can be seen in Figure 5-4 and Figure 5-6, where the EU, Euro area and the countries more affected by the economic crisis data are shown for the people at risk of poverty or social exclusion and the NEETs, respectively. Detailed data for every single country as well as the evolution on last years can be seen in Table 5-1. There are substantial differences among countries; nevertheless, complex and different factors seem to be the explanatory reasons for this disparities. One of the possible reasons, related to economic

issues and the economic crisis could rely on the belonging (or not) to the Euro Area because those countries involved in the unique coin have lost the monetary policy as a very powerful instrument to face the crisis. This point is taken into account in this work and it is analyzed.

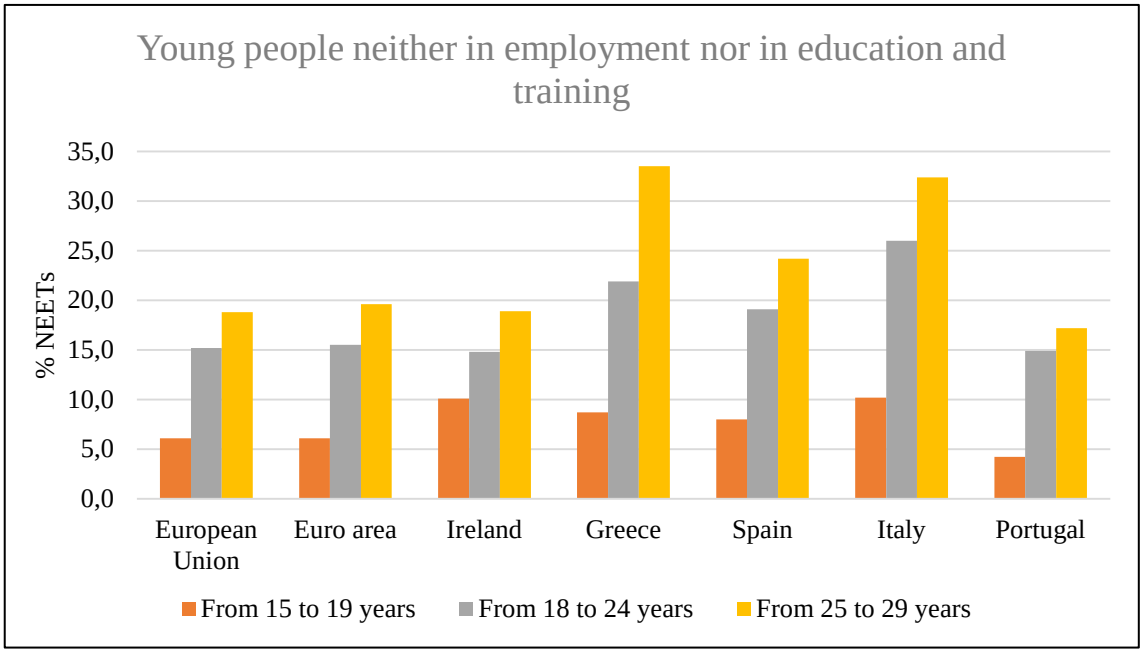
Table 5-1. % NEETs in the countries of the EU

GEO/TIME	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belgium	12	12.8	13	13.8	14.4	14.9	14.1	14.4	13	12.6
Bulgaria	18.5	20.8	23.5	24.7	24.7	25.7	24	22.2	22.4	18.9
Czechia	10.7	12.7	12.9	12.1	12.9	12.8	12.1	11.8	11.1	10
Denmark	5	6.5	7.3	7.6	8.2	7.5	7.3	7.7	7.4	9.1
Germany	11	11.4	10.8	9.7	9.3	8.7	8.7	8.5	8.9	8.5
Estonia	11.4	18.3	18.1	14.7	15.1	14.3	13.8	12.5	13.8	11
Ireland	15.5	20.2	21.7	22.4	21.6	18.8	18	16.7	14.7	12.9
Greece	14.8	15.9	18.6	23	26.8	28.5	26.7	24.1	22.2	21.3
Spain	15.3	19.9	20	20.6	22.2	22.5	20.7	19.4	18.1	16.4
France	12.6	14.7	14.8	14.7	15.1	13.8	14.1	14.7	14.4	13.9
Croatia	13	14.9	17.6	19.1	19.7	22.3	21.8	19.9	19.5	17.9
Italy	19.3	20.5	22	22.5	23.8	26	26.2	25.7	24.3	24.1
Cyprus	10.9	11.5	12.9	14.8	17.3	20.4	19.5	18.5	18	17.6
Latvia	13.6	20.8	20.7	19.1	17.2	15.6	15.2	13.8	13.3	12.3
Lithuania	11.9	15	17	14.7	13.9	13.7	12.9	11.8	10.7	10.2
Luxembourg	9.2	7.5	6.1	6.6	7.6	7.2	6.5	7.6	6.8	6.6
Hungary	15.9	17.9	17.7	17.6	18.7	18.4	16.4	15.1	14.1	13.3
Malta	11.4	12.6	12.2	12.1	12	10.9	11.6	11.8	9.4	8.8
Netherlands	4.6	5.3	5.7	5.9	6.5	7.5	7.6	6.7	6.3	5.9
Austria	8.9	9.6	9.1	8.5	8.2	8.6	9.3	8.7	8.9	8.4
Poland	12.7	14	14.8	15.2	15.7	16.2	15.5	14.6	13.8	12.9
Portugal	11.9	12.5	13.6	13.9	15.6	16.4	14.6	13.2	12.8	10.6
Romania	13.2	15.7	18.9	19.5	19.3	19.6	19.9	20.9	20.2	17.8
Slovenia	7.5	9.3	9.4	9.4	11.8	12.9	12.9	12.3	10.9	9.3
Slovakia	15.3	17.3	19	18.7	18.8	19	18.2	17.2	15.9	16
Finland	8.9	11.3	10.5	10	10.4	10.9	11.8	12.4	11.7	10.9
Sweden	8	9.9	8.3	7.9	8.4	7.9	7.8	7.4	7.1	6.8
United Kingdom	13.1	14.4	14.6	15.4	15.3	14.6	13.4	12.7	12.3	11.4

Note: highlighted those countries belonging to the Euro Area

Source: Eurostat - Young people neither in employment nor in education and training by sex, age and labour status (NEET rates) [edat_lfse_20]

Figure 5-6. Young people neither in employment nor in education and training in the European Union in 2016



Source: Own elaboration from EUROSTAT data [ilc_peps01].

Taking account the described scenario, the research question here to solve is if economic environment and risk of vulnerability influences the incidence of NEETs problem in the context of the EU and, if so, the magnitude of this influence. In accordance, the model proposed in this work tries to link the economic framework, on the one hand, the poverty and social exclusion risk and, on the other, to explain the amount of NEETs. Then, the dependent variable will be the people at NEETs situation and the impendent ones will be the Economic Environment and the Risk of Poverty and Exclusion and by means of this simple model, a casual relation is explored.

As it was shown, according literature, it is expected a causal relation between the situation of the economy and the incidence of the number of NEETs, as well as a direct and positive causal relation between the social situation (in terms of poverty and social exclusion) and the NEETs. Then, this relations can be summarized as the specific hypothesis to be tested, which are shown in Table 5-2. The first hypothesis (H1) is testing if the economic environment is a cause influencing the number of NEETs, if so, according literature, the expected sign of this relation should be negative, since the better economic environment, the lower NEETs incidence in the EU. The second hypothesis (H2) is testing whether the risk of poverty and social exclusion influences the number of NEETs in the EU. In the case

of the existence of this causal relationship, the expected sign is positive, since the higher the risk, the greater the number of NEET.

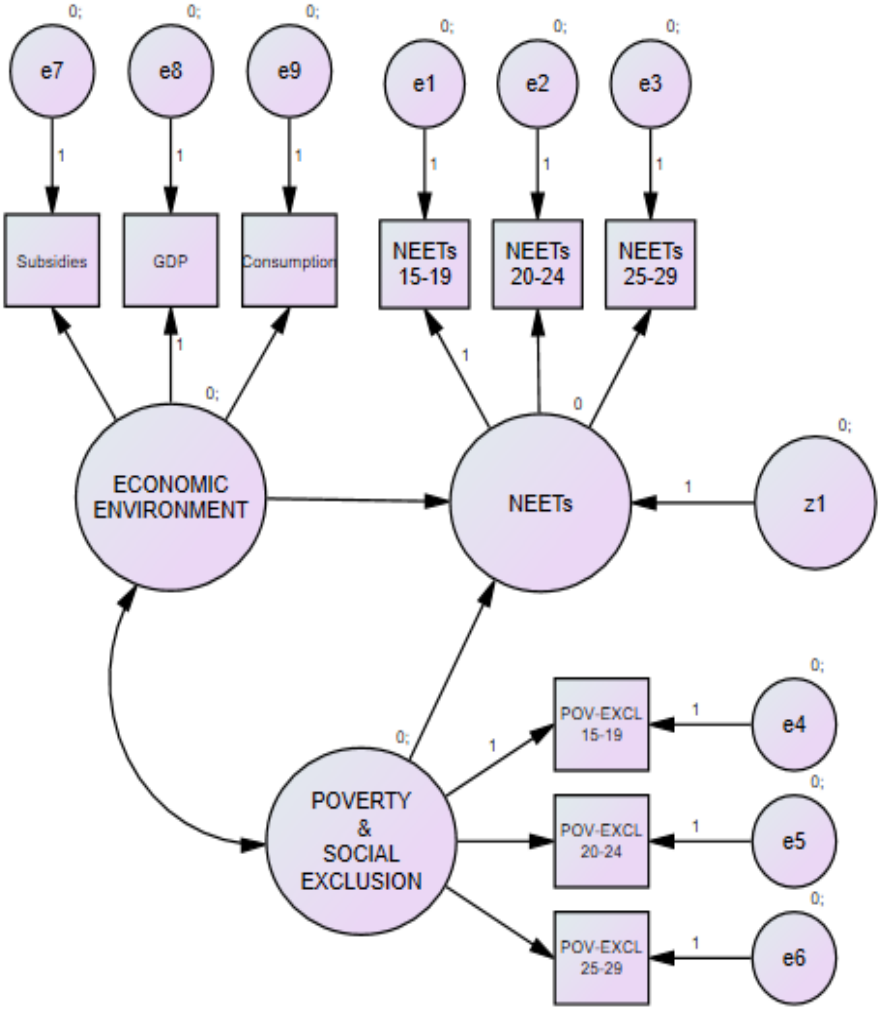
Table 5-2. Main hypothesis

Hypotheses
H1: Economic Environment influences on NEETs incidence in the European Union
H2: Poverty & Social Exclusion influences on NEETs incidence in the European Union

Hypotheses to be tested in this work

The graph representing this model is on Figure 5-7, by means of the output of the AMOS – IBM SPSS software. The big circles are representing the latent variables (ξ in equation 1), the squared/rectangles are the observable variables. The circles with the "e_i" (δ in equation 1) names are the measurement errors (related to the measurement model and the construction of the latent variables) and the circle with the "z1" is the estimation error (related to the structural model and the regression analysis).

Figure 5-7. The variables in the model.



In addition to this analysis, possible differences between countries should be explored to demonstrate the validity of the approach focused on the study of the European Union as a whole as well as to strengthen the proposed model, in case no differences have been found.

3. Method

The methodologic approach is a quantitative analysis in basis to the Structural Equation Modelling (SEM). It is worth highlighting the potential of the proposed methodology for the study of causal relationships between unobservable variables. This method applies jointly the techniques of factor analysis and linear regression. The SEM, have been useful to address many substantive problems in the social they have are based on the "path analysis" proposed by Wright (Wright, 1934; Wright, 1936) and later developed by Wright (Jöreskog, 1967; Jöreskog, 1973) and later by Jöreskog (Jöreskog, 1967; Jöreskog, 1973) and for Jöreskog y Sörbom (Jöreskog & Sörbom, 1993). SEM models analyze the causality between one or several variables (independent/or dependent), taking into account the existence of multiple interrelationships between them and with the possibility of working simultaneously with observed and latent variables, as well as stablishing causal relations. From our point of view, it is the adequate one, since the main objective is establishing a causal relation.

It is worth highlighting the potential of the proposed methodology for the study of causal relationships between unobservable variables. The aim is to jointly apply the techniques of factor analysis and linear regression, in the context of a specific theoretical frame of reference. Thus, it is intended to compare the behavior of a real situation with the expected (through the comparative analysis of the variance-covariance matrix of the model to be tested with the theoretical proposal). The confirmatory factor analysis allows to "create" or "construct" those variables that cannot be directly observed, mainly due to the multiplicity of factors that make them up (which are known, observable and quantifiable), all these observable variables together, as a set, constitutes the so-called "latent variable or construct".

The constructs are evaluated according to the so-called "measurement model", which analyzes their internal consistency and reliability. In addition, the "structural model" studies the causal analysis, which allows testing hypotheses of causality, according to an

expected theoretical model. The advantages of structural equations are manifested mainly in determining the reliability of the latent variable and its relation to each of the indicators that make it up, and, on the other hand, that allows us to test and quantify the expected dependence causal relationships, according to a model of linear regression, in which dependent and independent variables can be observable or latent.

In this study, we have three latent variables: the economic environment and the risk of poverty and social exclusion (as independent or explanatory variables) and the incidence of NEETs phenomenon (as the dependent or explained variable).

3.1. The measurement model

The observable variables data were collected from EUROSTAT database, particularly from specifically from Income and living conditions (ilc) and Annual national accounts (nama10) statistics for the structural model and from other EUROSTAT sources as [yth_empl_160], [yth_empl_140], [ilc_peps01], [edat_lfse_20] and, [nama_10_gdp]. The latent variables construction was aim to integrate all the relevant information about each of them. The NEETs variable (ξ_2) assemble all information about the percentage of NEETs in the European Union who are unemployed. To collect all range of the different indicators, the main three groups of ages were considered: from 15 to 19 years, from 20 to 24 years and from 25 to 29 years (see Table 5-3. Latent variables and indicators); in this way, the difference incidence of NEETs according the age's group (see Figure 5-4) is considered. It is interesting to point out that the range of age for NEETs is variable for different organisms and countries, for example, the United Kingdom references to people between 16 and 26 years, in Japan is from 15 to 34 years. The European Union considers youth to those 15-24 years, but for analyzing NEETs EUROSTAT provide data for those from 15 to 29 years. In this paper, we take all these range of age [15-29], due the relevance for the last stretch of ages.

The Economic environment latent variable (ξ_1) was constructed with the aim of collecting information about different spheres of the economy: one related to the general economic position of the country, the other to the consumers' purchasing capability and other about the public policies drove to support citizens. So, three indicators or observable variables were selected: one related to the global welfare situation of the country ("Gross domestic product" –GDP- measured at market prices, current prices, million euro), another as an

indicator of the expenses of the people (the "Final consumption expenditure" at current prices, million euro) and other related to the policies supporting citizenship ("Subsidies". Current prices, million euro).

Regarding the construct Poverty and Social Exclusion (ξ_3) it compiles the information by age sectors, with the aim of catching all possible dissimilarities of prevalence due to the age's group. So, the indicators are: % of people at risk of poverty or social exclusion (from 15 to 19 years), % of people at risk of poverty or social exclusion (from 20 to 24 years) and % of people at risk of poverty or social exclusion (from 25 to 29 years).

The measurement model explains the relation between latent and observable variables is reflected on the equation 1

$$X = \Lambda\ \xi + \delta \qquad (1)$$

3.2. The structural model

This causal relation can possible by means of the linear regression modelling, which is established between the two independent variables (the economic environment and the risk of poverty and social exclusion) and the dependent one: the incidence of NEETs, measured as a percentage of people in that rage of age (being NEETs from "i" to "j" years the percentage of people from "i" to "j" years who are neither in employment nor in education and training). The different incidence of the phenomenon NEET for the different groups of ages suggest to create a latent variable constructed with the information of all of these groups. So, the data of % of NEETs for each age's group are the observed variables, whilst all they together construct the variable NEETs of the proposed model, with the advantage of catching all the information in one single variable (see Table 5-3).

Table 5-3. Latent variables and indicators

Latent Variable	Indicator	Content
Economic Environment	Subsidies	Subsidies. Current prices, million euro. Data from EUROSTAT: GDP and main components (output, expenditure and income) [nama_10_gdp].
	Gross Domestic Product (GDP)	Gross domestic product at market prices. Current prices, million euro. Data from EUROSTAT: GDP and main components (output, expenditure and income) [nama_10_gdp].
	Final Consumption	Final consumption expenditure at current prices, million euro. Data from EUROSTAT: GDP and main components (output, expenditure and income) [nama_10_gdp]
Poverty and Social Exclusion	Risk of Poverty and Social Exclusion of people from 15 to 19 years	% of people at risk of poverty or social exclusion (from 15 to 19 years). Data from EUROSTAT: People at risk of poverty or social exclusion by age and sex [ilc_peps01]
	Risk of Poverty and Social Exclusion of people from 20 to 24 years	% of people at risk of poverty or social exclusion (from 20 to 24 years). Data from EUROSTAT: People at risk of poverty or social exclusion by age and sex [ilc_peps01]
	Risk of Poverty and Social Exclusion of people from 25 to 29 years	% of people at risk of poverty or social exclusion (from 25 to 29 years). Data from EUROSTAT: People at risk of poverty or social exclusion by age and sex [ilc_peps01]
NEETs	NEETs from 15 to 19 years	% of people at risk of poverty or social exclusion. Not employed persons. Neither formal nor non-formal education nor training. All ISCED 2011 levels (from 15 to 19 years). Data from EUROSTAT: Young people neither in employment nor in education and training by sex, age and educational attainment level (NEET rates) [yth_empl_160]
	NEETs from 20 to 24 years	% of people at risk of poverty or social exclusion. Not employed persons. Neither formal nor non-formal education nor training. All ISCED 2011 levels (from 20 to 24 years). Data from EUROSTAT: Young people neither in employment nor in education and training by sex, age and educational attainment level (NEET rates) [yth_empl_160]
	NEETs from 25 to 29 years	% of people at risk of poverty or social exclusion. Not employed persons. Neither formal nor non-formal education nor training. All ISCED 2011 levels (from 25 to 29 years). Data from EUROSTAT: Young people neither in employment nor in education and training by sex, age and educational attainment level (NEET rates) [yth_empl_160]

Latent variables and indicators are the observable values related to the constructs

The causal relationships are reflected with structural equations, that is, with regression equations in the context of a causal model (structural equation), where the coefficients are

known as structural parameters (Bentler, 1980). On the other hand, all these variables are not a simple measure of a single item. In fact, they are constructed by some different indicators, then, the measurement model contained in this methodology lead us to determine these variables in basis to the adequate indicators. The indicators for the unobservable variable are shown in Table 5-3.

The economic environment has been approached by means of the Subsidies as the indicator for the social protection expansion in the country; the Gross Domestic Product at market prices, defined as the final result of the production activity of resident producer units, as the measurement of economic activity; and the Final Consumption as an indicator of prosperity or spending capacity.

The Poverty and Social Exclusion and the NEETs latent variables were constructed taking account the different groups of age, since the incidence and behavior is quite different depending on the age (Quintano et al., 2018; Roberts, 2013; Thornham & Gómez Cruz, 2018). In fact, it has been proved that the NEET phenomenon involves mainly the older age classes (Quintano et al., 2018; Roberts, 2013).

On the other hand, the possible differences among countries were also analyzed. Since the last economic crisis hit in such a different impact on the countries belonging to the Euro Area (particularly those on the South of Europe), it could be expected a dissimilar impact on youth discouragement and their educational and labor engagement as well as in their interest in join labor market and/or training or education, as a consequence. For this reason, a t-test for means comparison analysis was undertaken. Two groups of countries were considered: those belonging to the Euro Area and the other European Union Members (with current composition). The main reason for studying this two blocks of countries is the possibility (or not) of using the Monetary Policy to face the crisis effects. Because for the countries immerse in the Euro Area, this possibility does not exist, since it is only on the hands of the European Central Bank. On the contrary, the other European countries are free to modify their exchange rate and it is a really important tool which could make a strong difference in the economic environment and in the public policies designed in this context.

4. Results

The reliability and internal consistency of the measurement model was tested by means of the, Cronbach's alpha (Cronbach, 1951), rates of composite reliability (Bacon, Sauer, & Young, 1995) and variance extracted values (Fornell & Larcker, 1981). It is accepted Alpha should be higher than 0.7 (Anderson & Gerbing, 1988; Hair, Tatham, & Black, 1999), composite reliability (CR) should take scores at least equal to 0.5 (Bagozzi & Yi, 1988) for confirming the internal consistency of constructs; another ratio to test the of the latent variable's strength is the average variance extracted (AVE), which should achieve values over 0.5 (Hair et al., 1999). Al the variables in the model are according this values. All indicators are significant (p-value < 0.05). The fit of the model was tested by means of the Comparative fit index (CFI) (Bentler, 1980), and the minimum discrepancy rate (CMIN/DF = $\chi^2/_{df}$ = Chi-Squared/ degrees of freedom) (Browne & Cudeck, 1993) which values are 0.932 and 0.171, respectively, and are according the suggested values for an acceptable fit.

Table 5-4. Results for the measurement model

Latent Variable	**Observable Variable**	**Squared Multiple Correlations (λ^2)**	**Alpha Cronbach**
Economic Environment (ξ_1)	Subsidies (x_{11})	0.694	0.750
	Gross Domestic Product (GDP) (x_{21})	0.998	
	Final Consumption (x_{31})	0.995	
Poverty and Social Exclusion (ξ_2)	Risk of Poverty and Social Exclusion of people from 15 to 19 years (x_{12})	0.790	0.795
	Risk of Poverty and Social Exclusion of people from 20 to 24 years (x_{22})	0.324	
	Risk of Poverty and Social Exclusion of people from 25 to 29 years (x_{32})	0.340	
NEETs (η)	NEETs from 15 to 19 years (y_1)	0.515	0.881
	NEETs from 20 to 24 years (y_2)	0.932	
	NEETs from 25 to 29 years (y_3)	0.876	

Main indicators for testing the accuracy of the measurement model

The equations for the measurement model are:

$$x_{11} = 0.83\,\xi_1, \quad (2)$$

$$x_{21} = 0.99\,\xi_1, \quad (3)$$

$$x_{31} = 0.99\,\xi_1, \quad (4)$$

$$x_{12} = 0.89\,\xi_2, \quad (5)$$

$$x_{22} = 0.57\,\xi_2, \quad (6)$$

$$x_{33} = 0.58\,\xi_2, \quad (7)$$

$$x_{13} = 0.72\,\xi_3, \quad (8)$$

$$x_{23} = 0.96\,\xi_3, \quad (9)$$

$$x_{33} = 0.94\,\xi_3, \quad (10)$$

The structural model results are summarized in Table 5-5, where the casual relations are assessed.

Table 5-5. Results for the structural model

Dependent Variable	Independent variable	Standardized Estimator	S.E.	C.R.	P	R^2 (fitted)
NEETs (η)	Economic Environment (ξ_1)	0.104	1.711	0.728	0.466	0.657
	Poverty and Social Exclusion (ξ_2)	0.816	0.234	3.181	0.001	

Taking into account the results of the structural model, it is shown that the risk of poverty and social exclusion is an explanatory variable of the incidence of NEETs among young people in the European Union, while economic factors are not significant.

$$\eta = \beta_1\xi_1 + \beta_2\xi_2, \quad (11)$$

$$\eta = 0.104\,\xi_1 + 0.816\,\xi_2, \quad (12)$$

In equation 11 it is described the structural model and in equation 12 there are the specific values of standardized estimators for this model.

The fitted R-squared is 0.657, what means that the model can explain more than 65% of the variability of the NEETs.

The analysis for searching differences among countries was conducted, to search for some evidence on this issue. A t-test for mean differences for independent samples was applied (with the SPSS IBM Statistics Program, 20th version). The results indicated that there were no differences for the whole number of NEETs neither for the consideration of the different groups of ages. Similarly, the results do not indicate statistically significant differences in the risk of poverty and social exclusion of young people as a whole, neither in data disaggregated by age groups.

5. Discussion

The results of this analysis indicate that the measurement model is adequate, because the values for the indicators shown in section 4 are in accordance with the standards. Therefore, the latent variables considered here are well constructed and accurately reflect the construction of the latent or unobservable variable that you were looking for.

Once that the unobservable variables are identified, the causal relationships among them are analyzed by conducting a linear regression analysis. The results indicate that one of the independent variables is not statistically significant to explain the dependent one: the economic environment P-value = 0.466), so H1 is not supported by this model. On the contrary, H2 is supported, because the variable risk of poverty and exclusion is statistically significant (P-value = 0.001).

By means of a Structural Equation Modelling, it is identified that the main determining factor for young people to become part of the NEET group is the vulnerability or risk of poverty and social exclusion. These results are consistent with many of those obtained by previous research. (de Souza Paulino & Bendassolli, 2018; Kieselbach, 2003; Quintano et al., 2018; Robles et al., 2016; Walther, 2002), because the risk of social inclusion is shown as a key point for avoiding discouragement and be more involved in society, and, as a consequence, avoiding to be a NEET.

The distribution of the NEETs in the different countries in the European Union was analyzed in this work, due that it is not the key issue here, an overview is provided. Attending from descriptive statistics from data provided in Table 5-1, it is clear that some deeper analysis is required. The focus on the differences among countries due to the belonging to the Euro-Area shown no statistical significance differences, which indicates that the economic environment (in terms of economic policies available) are not key to explain the incidence of the NEETs number. On the other hand, if there are no differences for the number of NEETs in the member states due to their economic status (monetary policy), the results obtained by the structural model remain consistent and reinforced.

6. Conclusions

The structural model shows that there is a causal relationship between the analyzed variables. The independent variables explain the incidence of the risk of becoming a NEET;

nevertheless, the causal relationship with the specific variable poverty or social exclusion is definite, however, the aspects related to the economic environment show weakness to explain the condition of NEETs, as it is not statistically significant. Thus, in relation to the hypotheses raised, we must confirm the second, but reject the first, which remarks the importance of avoiding the risk of exclusion and poverty in any country and economic environment, for that the discouraged youth not becoming a NEET. The response to the research question about the influence of the economic environment and risk of vulnerability on the incidence of NEETs problem in the context of the EU and its magnitude is partially affirmative, but point the different incidence of both dependent variables, since the one related to social issues is essential, whilst the economic issues has a subordinate importance.

This results, underlining the importance of social environment for NEETs in the context of the European Union, are according to the ones shown by previous researches (de Souza Paulino & Bendassolli, 2018; Kieselbach, 2003; Quintano et al., 2018; Walther, 2002) in several different frameworks.

The main conclusions point out to the reinforcement of social protection as a key factor for avoiding youth become discouraged and then, to diminish their probability of becoming a NEET. This social protection measures should be understood in a wide sense, that is to say, covering a wide range of public policies, both economic and social, including health and education (Varela-Candamio, Novo-Corti, & García-Álvarez, 2018), which are fundamental for youth development without inequalities (Torsheim et al., 2018). In summary, some measures driven to boost social cohesion and social sustainability could help to avoid the increasing of NEETs. Our results are in concordance with literature (Järvinen & Rinne, 2010; Robles et al., 2016), and goes one step ahead proving that the risk of exclusion and poverty is more relevant for becoming a NEET that an adverse economic environment. The strength and relevance of the results achieved in this work relay mainly in evidencing this point by means of the SEM's model which came to the conclusion that avoiding the risk of poverty and exclusion of youth, it will probably diminish the percentage of NEETs in the EU. Nevertheless, some limitations should be pointed out. On the one hand the cross-section nature of this analysis needs to be completed from a dynamic perspective, on the other hand, the study of the main reasons for explaining differences among countries should be undertaken, from the point of view for each single country,

since the analysis here presented just justified that there are no differences for belonging or not to the Euro Area.

Future research should analyze the dynamics of this issue, focusing on a wider range of years, as well as on some specific policies influence on the youth concerns to promote their engagement on society and creating a more inclusive and equitable society, compatible with whole sustainable development. On the other hand, deepening on the study of the differences among countries and the influence of their specific social policies for including the NEETs is needed.

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WELLBEING AT WORK: SELF PERCEPTION OF WORKERS FROM A GENDER PERSPECTIVE

6. Wellbeing at work: self-perception of workers from a gender perspective

PUBLICATION 4: Wellbeing at work: self-perception of workers from a gender perspective

Economic Computation and Economic Cybernetics Studies and Research, Issue 3/2017, Vol. 51

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WELLBEING AT WORK: SELF PERCEPTION OF WORKERS FROM A GENDER PERSPECTIVE

Abstract. *Perceived wellbeing at the workplace could be related to various factors such as the training received, the general working environment and particularly, the level of gender equality. Moreover is expected that the higher wellbeing at work will be reflected in a higher general welfare. This paper discusses the sense of wellbeing at the workplace, and general welfare, regarding the training and perceived gender equality for those employed in the Spanish System of Ports. To carry out the work, we have relied on the European Survey on Working Conditions, through the adaptation of that questionnaire. Through a structural equation model (SEM) analysis, and a mean comparison analysis, it was found that the women's perceptions on all studied variables are lower than the men's ones. We found a causal relationship between perceived gender equality, training courses and wellbeing at work, as well as between this last variable and general welfare.*

Keywords: *working conditions, gender equality, perceived equality, structural equations model (SEM)*

JEL Classification: J28, J16

1. Introduction

Achieving social and individual well-being is one of the main goals of individuals and governments. Most people get income that allow them to survive, through their work. Thus, social relations and labor relations are closely linked and societies are structured around the labor market. However, access to that market does not have the same difficulty for men than for women, and society and governments are aware of this situation(Estévez-Abe, Iversenand Soskice, 2001).

Wellbeing at work: self-perception of workers from a gender perspective

Isabel Novo-Corti
Asunción López-Arranz
Fernando González-Laxe
Jose Picatoste

Abstract

Perceived wellbeing at the workplace could be related to various factors such as the training received, the general working environment and particularly, the level of gender equality. Moreover is expected that the higher wellbeing at work will be reflected in a higher general welfare. This paper discusses the sense of wellbeing at the workplace, and general welfare, regarding the training and perceived gender equality for those employed in the Spanish System of Ports. To carry out the work, we have relied on the European Survey on Working Conditions, through the adaptation of that questionnaire. Through a structural equation model (SEM) analysis, and a mean comparison analysis, it was found that the women's perceptions on all studied variables are lower than the men's ones. We found a causal relationship between perceived gender equality, training courses and wellbeing at work, as well as between this last variable and general welfare.

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1. Introduction

Achieving social and individual well-being is one of the main goals of individuals and governments. Most people get income that allow them to survive, through their work. Thus, social relations and labor relations are closely linked and societies are structured around the labor market. However, access to that market does not have the same difficulty for men than for women, and society and governments are aware of this situation (Estévez-Abe, Iversenand Soskice, 2001).

Once somebody has got a job, they must keep it and perform their tasks in the best way possible, so they must attend training courses, if they seeks to improve for getting a better job or getting a better position in the same firm (Tam, 1997)have analyzed how increasing training has increased the women at high paying occupations, and they stated that "in terms of occupational structure, a higher percentage of women were employed in high-paying occupations, mainly due to improvements in their educational attainment".

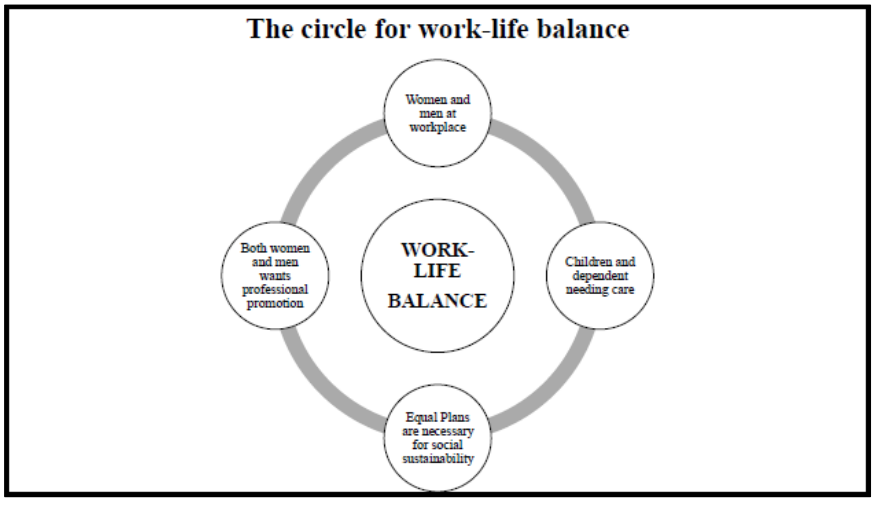
This is emphasized in the more specialized positions (Iversen and Rosenbluth, 2012), and, in occasions, women feel themselves excluded of some kind of jobs (Polachek, 1981). Moreover, the organizational structure of the workplace, has been identified as a potential proponent of work–life balance for the employee (Mazerolle and Goodman, 2013). Moreover, related to the expectations of those attending the courses (Tella, Ayeni andPopoola, 2007), the workers are willing to do and effort in the expectance of better conditions, improved salary or other material issue. In this context, women find themselves in situations of weakness, mainly because of their family responsibilities. Fursman and Nita (2009) have proved that for some people, accepting paid employment to fit in with their caring responsibilities resulted in significant under-employment, or underutilization of skills. Indeed, although it is proven that women have reached high levels academic training (even higher than men), they found difficulties in accessing management positions and also to promote themselves at work (the "glass ceiling").In trying to prevent such situations,

governments have enacted legislation to promote equality between the sexes. Specifically, in the working environment they have been launched called "Equality Plans".

Terms such as social wellbeing of workers may lead us to think of happiness but, in occasions, this has bad press. To talk of happiness and recognizing it has become cause for suspicion for some, to the point that the recognition of happiness becomes a sign of simplicity, typical of fools. This attitude reflects the fact that for many analysts, feeling happy is equivalent to a state of dereliction of introspection and lucid analysis of reality.

The study of subjective wellbeing refers to the degree to which individuals themselves say they are subjectively satisfied with their lives or some aspects of their lives (family, work) and does not have to be endorsed by the opinion of others (Avia and Valverde, 1999); This research is framed in the context of economic analysis and areas of labor legislation, related to gender equality, from an applied point of view. The focus is on the study of perceived wellbeing in the workplace through the analysis of job satisfaction. This variable will be explained in terms of perceived gender equality in the workplace and the efforts to keep updated through training courses. The main reason for this is that job satisfaction is considered a prerequisite for improving the living conditions of people. Therefore productivity of organizations could be augmented if these living conditions were favorable to increase perceived satisfaction. Figure 6-1 show the circle for work-life balance.

Figure 6-1. The circle for work life balance



Source: author's own

2. Wellbeing policies in the workplace in Spain

As is indicated in the VII report on exclusion and social development in Spain, the economic and financial crisis triggered in the European Union has not been an incentive, nor a good opportunity to deepen the commitment to the objectives of the Treaty on European Union and the Charter of Fundamental Rights of the European Union. Nor has it been used to develop policies aimed at creating harmonious, cohesive and inclusive societies, which respect fundamental rights in healthy social market economies, as is stated in the Treaty. The European Parliament criticized, with great harshness, the troika as an emergency mechanism to deal with the debt crisis of the Member States (Picatoste, Ruesga-Benito and González Laxe, 2016; Picatoste, 2014). It also states that the policies of austerity, with cuts in social services and welfare, as well as its deflationary impact on the economy, are incompatible with the objective of poverty reduction in the Europe 2020 Strategy, as well as other EU objectives such as social inclusion, equality, poverty eradication and territorial cohesion. Therefore, we can say that the crisis has imposed a setback and a decline in those economic, social and employment policies of the EU, which had helped to improve working conditions, health, safety, promotion of equal opportunities and social inclusion. This is therefore, the situation that currently prevails in the labour relations of our country to which our workers are subject. Restriction policies have forgotten that wellbeing at work is important, not only for the physical and mental health of the workers who consistently produce financial gains for employers and our social security system by decreasing occupational accidents and absenteeism from work but also above all it is well established that satisfied workers produce far more effectively thereby obtaining greater benefits for the company. Social policies applied since the end of 2011 with the first labour reform and those promoted by the Royal Decree-Law 20/2012 of 13 July (Spanish Royal Decree-Law 20/2012) on measures to ensure budgetary stability and promoting competitiveness, and currently in effect are resulting in the subordination the state of wellbeing to the demands proposed by the EU. These reforms have led to a significant decline in the social policies of our country.

2.1. The gender equality: the Equality Plans for the firms and the wellbeing at work

The difficulties of women for getting a job and maintaining it are clear (Durbin and Fleetwood, 2010), then, avoiding gender inequality is an important issue in all fields, and particularly in the workplace. This work is based on the European survey of working conditions (EWCS) (European Union. Eurofound, 2012). The European Working Conditions Survey (EWCS) is conducted by the European Foundation for the Improvement of Living and Working Conditions (EFILWC), which is an autonomous agency of the European Union (EU), funded from the general budget of the European Commission (European Foundation for the Improvement of Living and Working Conditions, 2012).Specifically, the factors which have been analyzed include: conflict with personal values, emotions, feelings, work stress and finally, the effort expended in updating workers' training as measured by the courses taken, whether or not financed by the company. On the other hand, gender based equality has been evaluated based on the promotion of balance between the number of men and women in the workplace, perceived equality and facilities for work conciliation. The study has been applied to the situation of workers employed in the Spanish ports of general interest.

Thus, the idea is to explain perceived wellbeing in the workplace in terms of continuing training conducted and perceived gender equality. Indeed, the academic training received and level of education attained, as well as training for current work are fundamental aspects to explain the employment status and job satisfaction perceived by workers. The main reason is based on the expectations generated, because everyone is hoping for an increase in status and prosperity within the structure of the business organization. The highest sensation of wellbeing is achieved via a higher level of education and work accomplished. It has been seen how the factors that most influence each person's subjective wellbeing is based not only on their own situations, but also in relationships with other people (couples, friends and co-workers), social participation, and the social environment (equality, civil liberties, respect for human rights, etc.). It is important to note that a focus on theories about wellbeing and happiness makes a significant contribution to projects in other businesses, such as law, economics or industrial associations, and they are closely related to the worker

as a human, whose feelings are a key issue (Worchel, et al, 2003).The human being is intrinsically a social being. Data from studies can be seen that although the amount of money you earn has little to do with happiness, how satisfied you are with your income is, and satisfaction does not always correspond with higher incomes (Diener and Fujita, 1995). In 1999, the International Labor Organization (ILO, 1999) created the concept of decent work as a way to identify the priorities of the Organization and to recognize that work is a source of personal dignity, family stability, peace in the community, democracies acting in benefit of all, and economic growth, which increases the opportunities for productive work and business development (Report of the director General to the 87th Meeting of the International Labor Conference held in 1999). The International Labor Organization unanimously adopted the ILO Declaration on Social Justice for a Fair Globalization on June 10, 2008 (adopted by the International Labor Conference at its Ninety-seventh Session, Geneva, June 10, 2008) (Rodgers et al, 2009). This statement comes at a crucial political moment, reflecting the wide consensus on the need for a strong social dimension to globalization which permits achieving improved results and that these results are distributed in a more equitable manner among all. The Declaration constitutes a compass for the promotion of a fair globalization based on Decent Work, as well as a practical tool to accelerate progress in the implementation of the Decent Work Agenda at the country level. It also reflects a productive perspective that emphasizes the importance of sustainable businesses for creating more jobs and income opportunities for all. The Conference recognizes and declares that "in the context of accelerating change, the commitments and efforts of Members and the Organization to implement the ILO's constitutional mandate, including through international labor standards, and to place full and productive employment and decent work at the center of economic and social policies, should be based on the four strategic and equally important objectives of the ILO, through which DWA is reflected and can be summarized in promoting employment by creating a sustainable institutional and economic environment under which people can develop and update skills and competencies they need to work productively occupied for their personal fulfilment and the common good".

2.2. The Spanish port system and their Gender Equality Plan

The main objective of this paper is to analyze the wellbeing of the people who serve as employees in the principal Spanish ports, known as "ports of general interest" (a total of 28 Port Authorities), all dependent upon an autonomous body named "Puertos del Estado" ("State Ports") under the Ministry of Development. The reason for choosing this network of large workplaces is that they have an Equality Plan in place which has been approved by the Government of Spain, and one of the most important networks where it was lunched was in the Autonomous Centre for manage the most important Spanish Ports: "Puertos del Estado". Those ports are shown in Figure 6-2. The employment at ports was traditionally be masculinized, but nowadays women are also involved in this sector and is particularly important to boost women to engage in training, because on-the-job training is generally considered to be more important in high-skilled jobs (OECD, 2003) and it should be avoided to increase gender differences in access to such training, because it is likely to produce a larger wage gap among the high-skilled. The study aims to identify and quantify, where appropriate, the relationship existing between perceived equality, training courses conducted, and perceived satisfaction in the workplace, from a gender perspective. The work was carried out through the evaluation of perceived job satisfaction, perceived gender equality and efforts dedicated to job training. It was based on the European Working Conditions Survey.

Figure 6-2. Spanish port system: the main ports.

Source: Puertos del Estado (2015)

3. Purpose of this work: analyzing self-perception's of wellbeing at work from a gender perspective

The success of equality plans, allows to achieve a more equal partnership between men and women. This success also translates into greater well-being for both genders. The welfare encompasses all aspects of life, and is determined both by feelings at work as feelings outside of work. Continuous learning and training are factors influencing wellbeing at work, not only because they generally give access to better positions, but also because they generate feelings of personal satisfaction. Therefore, it is expected that efforts in professional training positively affect the workplace wellness. This point can be considered overall for men and women. Nevertheless, women often are private of this possibility, due the gender inequality, because it is the woman who often take on household chores and caring for young children and elderly dependents (Grönlund and Magnusson, 2016).

Training in the workplace improves the skills of workers, but, at the same time, it involves a cost to the company, in these circumstances, employers are often unwilling to invest in training women because they fear that their investment may not be as profitable as in men, precisely because of the family responsibilities that women take (Tam, 1997).

In this paper, our goal focuses on the influence of the overall aspects related to gender equality in personal wellbeing and the influence of this equality (promoted by equality plans) on such wellbeing. Equality plans take action at the working environment. If these plans work properly, it is likely that workers perceive greater wellbeing at work, and this perceived wellbeing, the greater will be, the higher the effective equality be (Polavieja, 2008). In addition, welfare at work affects the feelings outside of work. Also, equality plans allow workers better organizing their time, which could lead to attend more training courses, which also affect their welfare. Eventually, welfare at work results in general welfare. With the porpoise of testing these statements in the interesting experience of implementation the Equality Plans at the most important Spanish ports (those managed by "Ports of the State"), we formulated the next research questions:

Question 1: Identifying factors related to equality, which determine the wellbeing at work in the main Spanish ports. Is there a causal relationship between the factors related to launching Equality Plans and wellness at work?

Question 2: Evaluate the extent that factors related to equality influence the welfare at work of employees in the Spanish Port System and check which ones have the greatest influence. Which of the explanatory factors has the greatest influence on wellbeing at work?

Question 3: Assess the extent to labor welfare of employees in the Spanish port system influences their overall well-being: How much is the influence of the welfare at work in the general welfare?

Question 4: Determining whether men and women have the same perceptions of the influence of factors related to equality, both in wellbeing at work, and general well-being: Do men and women have the same perceptions of the variables related equality?

4. Method

To answer our research questions, we need to work with variables like "Wellbeing at work", "Gender Equality", "Training" and "General Welfare". These variables cannot be measured directly. Then, we have "constructed" through a structural analysis of covariance, in basis to other variables directly observable. These variables are called constructs or latent variables, precisely because of the difficulty in measuring them directly (Jöreskog, 1970).To get the data for the observable variables, we conducted a survey. In basis to the EWCS, we elaborated an adapted short questionnaire and distributed on several ports of Spanish system. Ultimately, with the data obtained and the analysis realized in Spanish ports, this paper has explained general feelings through the Structural Equation Model. This analysis system has become an important tool for hypothesis testing on components of wellbeing. With them, we could get a measure of the feelings that workers perceive regarding social and individual wellbeing and the influence of training received under the research of latent variables, which will give us indicators of the sample taken, so the use of structural equation tells us which of them has more or less influence. So, we have measured feelings at work such as good humor, joy, peace, energetic and active sensation, awakening

refreshed and rested, and an interest in everything work-related. So, a questionnaire was conducted at the main Spanish ports. It was adapted from the 2010 questionnaire of the EWCS, which covered several aspects of working conditions, including physical environment, workplace design, working hours, work organization, well- being, and social/colleague relationships in the workplace. Demographic information was also collected (European Union. Eurofound, 2012).

The questionnaire was focused on the four main variables to analyze the equality, the training, the wellbeing at work and the general welfare. For getting a representative sample of Spanish ports system, we decide to choose 14 of the 28 ports, taking account their specialization (on container traffic, bulk, etc.) and their geographical position. The questionnaires were sent by post to one worker at the port, who was contacted previously and who agree to help us. Finally, we got 174 valid questionnaires, from 94 men and 80 women Spanish ports. Factor related to Equality at work and the observed variables asked for assessing them. People who answered the survey have a good knowledge of the company. This is proved in Table 6-1, in which time they had been working on the port at the time of this survey is collected. The descriptive statistics for all items asked are shown in Table 6-2, in this table there are pointed the items related to the EWCS. The variable "Equality at work" was evaluated through authors own questions, because they have no similar questions at EWCS. The procedure, once the data was collected in the ports, has been to make a study using Structural Equation Modelling (SEM) to explain the causal relationships among some latent variables. (Latent variables are those that cannot be measured directly, so they are constructed using the indicators included in the survey.) Also the causal relationships among these variables are explained (i.e. the effect that each variable has on another).

Table 6-1. Working time in the port

Working time in the harbour	Frequency	%	Accumulated %
Less than one year	21	12.07	12.07
Between 1 and 2 years	7	4.02	16.09
Between 2 and 5 years	12	6.90	22.99
Between 5 and 10 years	33	18.97	41.95
More than 10 years	101	58.05	100.00

Table 6-2. Factor related to Equality at work and the observed variables for assessing them

Code	Wellbeing at work	Observable variable	Men		Women	
			Mean	SD	Mean	SD
W1	You have the feelling of doing useful work (a) You know what is expected of you at work (a)	Doing an useful work	4.415	0.739	3.775	0.927
W2	You know what is expected of you at work (a)	Know exactly what to do	4.309	0.880	4.038	0.818
W3	Your job gives you the feeling of work well done (a)	Doing a good work	4.266	0.806	3.863	0.791
W4	Your colleagues help and support you (a)	Support from my colleagues	4.287	0.697	4.075	0.689
	Training					
T1	The training has helped me improve the way I work (a) I have the skills to cope with more demanding duties (a)	Improved with training	4.500	0.730	4.288	0.660
T2	I have the skills to cope with more demanded duties (a)	Don't need training	4.489	0.699	4.338	3.383
T3	I feel my prospects for future employment are better (a)	Better future	4.266	0.857	3.738	3.383
T4	The company has mechanisms for promoting equality and work life balance (b)	Work life balance	3.266	1.184	2.788	1.187
	Equqlity at work					
E1	The company has mechanisms for promoting equality and work Work life balance (b)	Work life balance	3.266	1.184	2.788	1.187
E2	The Equality Plan of the company helps working conditions for equality are real and effective (b)	Effective equality plan	2.798	1.500	2.057	1.145
E3	Those responsible for personnel selection of the company comply with the principle of balanced presence between women and men (ie. that people of each sex not exceed 60% or less tha 40%)(b)	Gender balance	2.330	1.379	1.975	1.147
	Gender welfare					
GF1	I have felt cheerful and in good spirits (a)	Glad & happy	4.489	0.800	4.388	0.864
GF2	I have felt calm and relaxed (a)	Calm & relaxed	4.362	0.926	4.063	0.946
GF3	I have felt active and vigorous (a)	Active & Vigorous	4.521	0.800	4.188	0.956
GF4	I woke upo feeling fresh and rested (a)	Fresh & rested	4.255	0.915	3.850	1.148

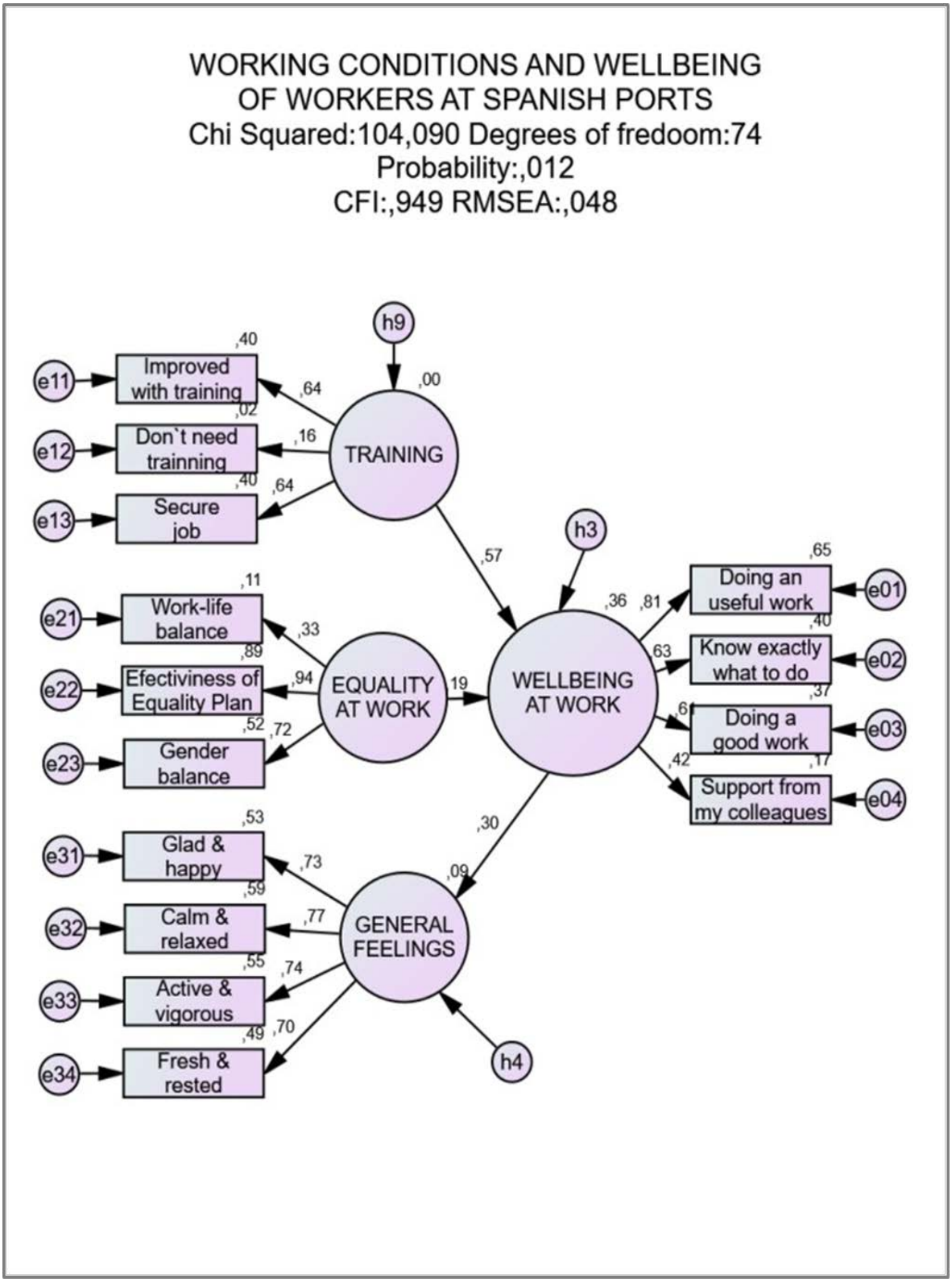
(a) Item from EWCS-2010
(**) Authors' own

5. Results and Discussion

5.1. Structural Equation Modelling

In order to answer the Research Questions (RQ1, RQ2, RQ3), we will test the hypothesis H1: The equality issues have not influence on wellbeing at work, for the employees at Spanish Ports System, H2: The training has not influence on wellbeing at work, and H3: The wellbeing at work has not influence in the general welfare. We used a structural equation model (SEM).The results of the whole model are shown in Figure 6-3 and Table 6-3 and Table 6-4. Moreover, Figure 6-3 represents the structural model and the standardized results. The model was estimated by the maximum likelihood method.

Figure 6-3. The model



The fit

The fit index shown in Table 3. Al values indicate that the fitting of the model is good

Table 6-3. Fit of the model

Fitindex	**Score**	**Reference marks**	
		Good fit	Acceptable fit
Chi-squared	104.09		
Degrees of freedom	74	1 ≤ Chi-Squared ≤ 2df	2df ≤ Chi-Squared ≤ 3df
Significant	0.012	0.5 ≤ P ≤ 1.00	0.1 ≤ P ≤ 0.05
Chi-Squared/df	1.407	0 ≤ Chi-Squared/df ≤ 2	2 ≤ Chi-Squared/df ≤ 3
RMSEA (Root mean square error of approximation)	0.048	0 ≤ RMSEA ≤ 0,05	0.05 ≤ RMSEA ≤ 0.10
CFI (Coomparative fit index)	0.949	0,95 ≤ CFI ≤ 1,00	0,94 ≤ CFI ≤ 1,00
GFI (Goodness of fit index)	0.933	0.95 ≤ GFI ≤ 1	0.90 ≤ GFI ≤ 9.95
AGFI (Ajusted goodness of fit index)	0.905	0.90 ≤ GFI ≤ 1	0.85 ≤ GFI ≤ 0.90

Causal relations: the estimators

Table 6-4. Estimators and their significance

RegressionWeights			**Estimator**	**Standarized Estimate**	**S.E.**	**t**	**P**
Training	→	Wellbeing at	0.450	0.568	0.122	3.688	***
Equality at Work	→	work	0.102	0.189	0.047	2.178	0.029
Wellbeing at work	→	General Welfare	0.439	0.303	0.144	3.042	0.002

All the relations tested among the constructs are significant (Table 4). So we have proved the expected influences among them. Our first research question was trying to identify the factors related to equality which determine the wellbeing at work in the main Spanish ports and find a possible a causal relationship between the factors related to launching Equality Plans and wellness at work?. Our second research question was trying to evaluate the extent that factors related to equality influence the welfare at work of employees in the Spanish Port System and check which ones have the greatest influence, so we tried to answer the question of which of the explanatory factors has the greatest influence on wellbeing at work.

Our model has shown that the constructs *equality at work* and *training* influence positively (coefficients are 0.189 and 0.568 respectively) and significantly (p = and p<0.001 respectively) to *Wellbeing at work*. So we can conclude that we have identify at least two factors which influence positively the wellbeing at work, and we can summarize this relation in Equation (1), and that that the greatest influence on the positive feeling at workplace are linked to the training (as it is shown for the higher score of the construct *training*. Nevertheless, we are aware of the importance of work-life balance for women, in order they can attend training courses and their family life at the same time.

$$WW = 0.568\ T + 0.189\ EW \quad (1)$$

We have hypothesized that:

- H1: The equality issues have not influence on wellbeing at work, for the employees at Spanish Ports System
- H2: The training has not influence on wellbeing at work

For testing the H1 hypothesis, we attended to the relation among the constructs *equality at work* and *Wellbeing at work*. We have got a significant (p<0.029) causal relation, and the regression coefficient is positive (0.189), what is meaning that the higher is the equality at workplace the higher is the Wellbeing at work. So, H1 is rejected. And we state that the employees at Spanish ports perceive a positive relation between the equality at workplace and their wellbeing at work.

Equation (1) lead us to say that we should reject H2 hypothesis, because the latent variable training has shown significant for determining the *Wellbeing at work.*

The third research question was related to de assessment the influence of labor wellbeing of employees in the Spanish port system on their overall well-being, and evaluate its extent. As the latent variable *welfare at work* has been shown has significant (p = 0.002) for explaining the *general welfare* construct, with a standardized regression coefficient 0.303, we are able to responding our question positively: the higher is the wellbeing at work the higher is the general welfare.

In consonance with the response to our third research question, we have to reject H3 hypothesis:

- H3: The wellbeing at work has not influence in the general welfare.

5.2. Mean differences

For responding the last research question: Determine whether men and women have the same perceptions of the influence of factors related to equality, both in being at work, and general welfare, we have stated the hypothesis below, and we have conducted a t Student test and Levene test for mean comparison. Related to this question, we have formulated the next Hypothesis:

- H4: Women and men perceptions about equality issues are the same
- H5: Women and men perceptions about training issues are the same
- H6: Women and men perceptions about wellbeing at work are the same
- H7: Women and men perceptions about general welfare are the same

The t Student and Levene test for mean comparison results are shown in Table 6-5.

Table 6-5. T student and Levene test

	Levene test for equal variances		T test for mean equality		
Items	**F**	**Sig.**	**t**	**Fd**	**Sig (two-tailed)**
You have the feelling of doing useful work (a) You know what is expected of you at work (a)	5.717	0.018	4.972	150,219	0.000
You know what is expected of you at work (a)	0.416	0.520	2.090	172	0.038
Your job gives you the feeling of work well done (a)	1.089	0.298	3.319	172	0.001
Your colleagues help and support you (a)	0.627	0.429	2.011	172	0.046
The training has helped me improve the way I work (a) I have the skills to cope with more demanding duties (a)	0.743	0.390	2.000	172	0.047
I feel my prospects for future employment are better (a)	2.762	0.098	3.604	172	0.000
The company has mechanisms for promoting equality and work Work life balance (b)	0.216	0.543	2.653	172	0.009
The Equality Plan of the company helps working conditions for equality are real and effective (b)	7.511	0.007	3.600	170,088	0.000
I have felt calm and relaxed (a)	0.604	0.438	2.104	172	0.037
I have felt active and vigorous (a)	1.316	0.253	2.508	172	0.013
I woke upo feeling fresh and rested (a)	3.151	0.078	2.590	172	0.010

[(a)] Equal variances are assumed [(b)] Equal variances are not assumed

5.3. The equality

The null hypothesis H4: Women and men perceptions about equality issues are the same was tested in basis to the items E1, E2 and E3. The results have shown statistical significant mean differences for E1 (Work life balance) and E2 (Effective equality plan) (Table 5). The means scores in responses to the question "The Company has mechanisms for promoting equality and work life balance" for men and women are, respectively, 3.266 and 2.788, showing that women perception of the implemented mechanisms for promoting equality is lower than the men. The work-life balance is appreciated as quite good for men (scores >3), but don't get the "pass mark" for women.

Similar situation is showed for E2, question that is assessing the perceived effectiveness of the equality plan. Women means score is 2.075, lower than men score (2.798) showing that

their perception is that the effectiveness of the Equality Plan is not as good as the males (Table 2). Nevertheless, we have to point out that evaluation, of the real and effective application of the Equality Plan, has scores under 3, for both sex, which is a poor assessment.

Both of those items (E1 and E2) lead us to reject the null hypothesis H4 with a significances of 0.009 (E1) and <0.001 (E2). The latent variable "Equality" is constructed for three items, only one of them shown not mean differences (E3 - Those responsible for personnel selection of the company comply with the principle of balanced presence between women and men - that people of each sex not exceed 60%. or less than 40%), moreover this is item is quite observable and free of subjectivity, because gender balance in the firm is quite easy of probing. Our conclusion for testing H4 is that it should be rejected, because we have probed that women perceptions of equality are lower than men perceptions.

5.4. Training

Equal means hypothesis for H5: Women and men perceptions about training issues are the same, should be rejected. We have found differences on means for the items T1 (The training has helped me improve the way I work), T3 (I feel my prospects for future employment are better) and E1 (The Company has mechanisms for promoting equality and work life balance analyzed in the previous part).

Only the item T2 (I have the skills to cope with more demanding duties) has no shown differences. For the training as a mechanism for improvement at work, as well as for the feelings of possibilities of promotion through the training, women scores are lower (4.288 and 3.738, respectively) than the men (4.500 and 4.266, respectively). The importance of item E1 for training is crucial, because without work-life balance most women couldn't attend the training courses. So, the hypothesis H5 is rejected.

5.5. Wellbeing at work

H6: Women and men perceptions about wellbeing at work are the same, is rejected for all the items involved in general welfare (W1, W2, W3, W4), with a respective significance level of under 0.001 per cent, 0.038 per cent, 0,001 per cent and 0.046 percent.

The mean score achieved for women responses for the question "you have the feeling of doing useful work" (W1) is 3.775, and for men is 4.415, so women's feelings about the useful of their work is lower than the man. For the item W2, evaluate through the question "You know what is expected of you at work" respective mean for women and men are 4.309 and 4.038. Women's means are lower than men's, then the women are not so sure about what is expected from their work. The means scores for query "Your job gives you the feeling of work well done" are 4.266 (men) and 3.863 (women), which means that this satisfaction feeling is less assessed for women. The last question related to Hypothesis H7 "Your colleagues help and support you" is pointing to the same direction that the previous ones: means for men are higher (4.075) than women (4.287), that is to say: women don't feel so much supported by their colleagues at workplace than their masculine fellows.

All items indicate a lower level of well-being perceived by women, and in all cases the differences in averages are statistically significant, as a consequence, rejecting the null hypothesis H6 leaves no doubt.

But discrimination at labor market is still remaining for women in many parts of the world, and female face different types of discrimination at their workplaces, even if men and women possess the same factors such as the education level and experiences (Othmanand Othman, 2015). This fact could explain that female's perception of effectiveness of policies boosting equality seems to be lower than the men perception.

5.6. The general welfare

The null hypothesis H7 (Women and men perceptions about general welfare are the same) has shown differences in means for three of the four items, with a significance level of 0.04 (Table 5). Women feel less calm and relaxed (mean

4.063 women, 4.362 men), less active and vigorous (mean 4.188 women, 4.521 men) and they wake up feeling less fresh and rested (3.850 women, 3.850 men) than men (Table 2). Nevertheless the scores are quite high for all, what means that the respondents to our questionnaire general welfare is quite good. In basis to the analyzed results, the Hypothesis H7 is rejected.

6. Conclusions

The legal framework for equality is the first step, but more effort should be done by entrepreneurs and policy makers. Both women and men, agree about the poorness of real effectiveness of Equality Plan, but women's perception about this effectiveness is even lower than the men. The work-life balance is still over the woman's shoulders, as we have stated through analyzing the differences in perceptions between sexes.

We have identify at least two factors which influence positively the wellbeing at work: the equality and the training, so it remarks the importance of Equality Plans for boosting welfare at work. And we have proved that there is a positive relation among positive feelings at work and general good feelings, because we have accomplish, as a result of our research model, that the higher is the wellbeing at work, the higher is the general welfare.

Moreover, we have achieved the result that the employees at Spanish ports perceive a positive relation between the equality at workplace and their wellbeing at work. So, if there is a "chain" relation as the one showed in figure 44, the Equality Plans are so important for increasing population general welfare, which positive effects on such a high number of issues, as health, for example, is out of the extent of this work, but we are aware that the efforts for boosting equality at workplace is a matter which implications goes beyond the intention of solving work-life balance and supporting women's rights. About the causal relationship between perceived gender equality in the workplace and the wellbeing perceived in the workplace, we would like to point out that, since perceived gender equality, based on the work presented here, is measured on one pioneer sector applying Equality Plans, we consider it necessary that the practical implications that could indicate causality should be analyzed in more sectors for getting a more extended and strong assessment.

About differences on men and women perceptions about equality and training issues, for the employees of Spanish Ports System, we have verified that female has lower perceptions, and is the same with wellbeing at work and general welfare.

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OVERALL RESULTS AND CONCLUSIONS

7. Overall results and conclusions

7.1. Global summary and results discussion

A global interpretation of the results obtained with the four publications selected for this dissertation points to the importance of ICTs for the achievement of employment. The advances in innovation and technology are very fast, so much so that they are often classified as "disruptive". This means that continuous updating is essential for achieving knowledge and skills in this field. Consequently, young people who show up-to-date knowledge about ICTs will have more possibilities of finding a job. In the research presented in this paper, the geographical frame of study refers to the European Union.

The results obtained point to two important factors: knowledge and skills or training in the use of ICTs and, it has been proven that education is important for both factors. However, if one takes into account the type of education received, it is found that it is precisely informal education which is significant in explaining both the increase in the employability of young people and the acquisition of skills with computers (publication 1, collection in chapter 4, section 4.1).

The everyday presence of ICTs in any social sphere is widespread, being the so-called "Smart Cities" the paradigm of the application of technology for socio-economic well-being. In this environment, it has been found that the skills that young people have with computers are an important explanatory variable of getting a job (as indicated by publication 2, included in Chapter 4, section 4.2, it would explain 40% of the employability of young people in the European Union).

On the other hand, although there has been a certain homogeneity in the whole European Union, some differences have been revealed in very important points, in particular, in the assessment that ICT skills have for employability and in raising awareness about the importance of maintaining training and continuous training in computer skills throughout

life, such as continuous learning throughout life. It is the young people who live in the countries of the Eurozone who are most aware of both aspects.

In general, smart cities are an inclusive space, aware of the importance of ICTs and the training of young people that promote both their employability and their social inclusion. In this sense, they will be suitable environments to prevent young people with more difficulties from falling into discouragement and become part of the group known as NEETs.

The third article included in this thesis (corresponding to Chapter 5) precisely analyzes the explanatory factors of the incidence of this phenomenon in the European Union, concluding that the socio-economic environment and social policies are very important to avoid the discouragement of young people and their distancing from the labor market. It has been found that the conditions marked by the macroeconomic variables of the country are less influential in the percentage of NEETs than the social conditions (the results of the third contribution, presented in chapter 5, have shown that economic conditions are not statistically significant in explaining the incidence of the number of NEETs in the European Union environment).

Taking into account that social welfare is the ultimate goal, the last publication included in this dissertation (chapter 6) incorporates transversal variables such as the gender perspective and the influence of well-being at work on general welfare. The effects of the application of the equality law promoted in Spain on welfare at work are analyzed. In the study of the case raised for the application of equality plans in a public institution in Spain, it has been proven that there are two important factors that explain well-being at work: perceived equality and the access to on-the-job training. Then, the more equality is perceived in the work and the more facilities for training are found, the greater is the well-being perceived in the work environment and, because of this, the greater is the general welfare. This result highlights the importance of policies that promote support for less-favored groups of workers as a means to increase well-being.

7.2. Final Conclusions

In this dissertation, the study of youth unemployment within the framework of the European Union has been the objective. After analyzing the essential factors that may influence it, four papers are presented, shown in three chapters, corresponding to chapters 4, 5 and 6 of this dissertation. They study factors related to the knowledge society in which young people live. On the one hand, in the paper "A New Educational Pattern in Response to New Technologies and Sustainable Development. Enlightening ICT Skills for Youth Employment in the European Union" and "Smart Cities for Wellbeing: Youth Employment and their Skills on Computers", included in chapter 4, (sections 4.1 and 4.2.), the importance of ICT training in youth employment has been confirmed in the European Union as well as the environment created by smart cities to achieve employability. This environment has been shown to be the basis of two complementary points of view for both knowledge and skills in ICTs as well as the use of computers as a means for labor inclusion of the youngest in the context of the European Union. These results are in line with the academic literature. As an example, Ruesga Benito et al., (2014) have proven the importance of the irruption of highly changing technological environments in society, especially with regard to information and communication technologies (ICTs) and the turbulence in the evolution of the globalized economy, marked by economic cycles which affect the state of welfare in general and the labor market in particular.

The fifth chapter shows the paper "Sustainable Development, Poverty and Risk of Exclusion for Young People in the European Union: the case of NEETs". It analyzes the influence of the economic environment and the social environment, and it is useful for verifying the explanatory factors in the number of young people who have fallen into discouragement and do not participate in education or employment. In the explanation of the incidence of the phenomenon of NEETs in the European Union, the socio-economic environment is shown as much more relevant than other issues related to the macroeconomic framework. Then, the existing social support policies become essential. Together with the results of the other investigations presented here, this reinforces the idea of the importance of the management of inclusive policies, especially in the educational

framework and ICTs. As with the papers presented in the two sections of the fourth chapter, the results obtained have also been shown to be in line with previous academic studies. For example the research of Refrigeri & Aleandri (2013) indicates that the models about the transitions of youth from education to the labor market are closer to the to the educational models than to the macroeconomic environment of the specific country.

Finally, a fourth essay is presented in the sixth chapter, consisting of a survey carried out to evaluate workers' feelings and perceptions within workspaces, when a policy favoring equality, conciliation and support for a specific group is applied. In this case, the policies related to vulnerable groups, such as that of women, is studied. In this chapter, the feelings of working people were analyzed and they have been related to labor and social well-being, as well as to the effects of inclusive labor policies applied in the workplace. For this reason, the paper performs a case study and it has been necessary to carry it out among employed people, precisely in order to be able to assess the situation within the work environment.

The set of these four publications allows us to reach general conclusions, based on the conclusions of each of them, interpreted jointly. In summary, these conclusions are:

- ICT education is essential for young people in the European Union to get a job
- Informal education is more effective than formal education for young people in the European Union can get a job.
- Training in the use of computers increases the chances of getting a job for young people living in the European Union.
- Informal education and continuous training, not only favor the employability of young people, but also once they get a job, increases their welfare in the workplace and, consequently their general well-being.
- Policies favoring equality improve the well-being perceived in the workplace and the general welfare.
- Social policies are more influential in decreasing the number of NEETs than a favorable macroeconomic environment.

- Young people belonging to the Euro Zone are more aware of the importance of training in the use of computers as well as knowledge and skills with ICTs, than those who do not belong to that space within the European Union.

As a corollary or global conclusion, it could be said that continuous training in ICTs and computer skills is important to achieve a job, to feel better at work and to increase overall well-being. The inclusive environments created by Smart Cities, together with labor policies that promote equality and the inclusion of vulnerable groups, are an essential support for the employability and well-being of young people and societies. Bearing in mind, moreover, that social policies are more effective in minimizing the incidence of discouragement in young people, the main conclusion of this work points to the recommendation of designing inclusive policies of continuous training in ICTs, mainly through informal education, jointly with labor policies that favor equality and the integration of vulnerable groups in the workplace. This would not only favor the employment of young people and minimize the "NEETs" phenomenon, but also labor and social welfare.

RESULTADOS Y CONCLUSIONES GENERALES (IN SPANISH)

7. Resultados y conclusiones generales (in Spanish)

7.1. Resumen y discusión de resultados

Una interpretación global de los resultados obtenidos con las cuatro publicaciones seleccionadas para esta tesis doctoral apunta hacia la importancia de las TICs para la consecución del empleo. Los avances en innovación y tecnología son muy rápidos, tanto que no es infrecuente que se les califique como "disruptivos". Esto significa que la actualización continua es esencial para disponer de conocimientos y habilidades en este terreno. Como consecuencia, los jóvenes que muestren conocimientos actualizados sobre TICs tendrán más posibilidades de encontrar un empleo. En las investigaciones presentadas en este trabajo, el marco geográfico de estudio se refiere a la Unión Europea.

Los resultados obtenidos han apuntado hacia dos factores importantes: el conocimiento y las habilidades o capacitación en el uso de TICs y se ha comprobado que la educación es importante para ambos factores. No obstante, si se tiene en cuenta el tipo de educación recibida, se comprueba que es la educación informal la que se muestra significativa para explicar tanto el aumento en la empleabilidad de los jóvenes como la adquisición de habilidades con los computadores (publicación 1, recogida en el capítulo 4, sección 4.1).

En las sociedades actuales la presencia cotidiana de las TICs en cualquier ámbito social está ampliamente extendida, siendo las llamadas "Smart cities" el paradigma de la aplicación de la tecnología para el bienestar socio-económico. En este entorno, se ha comprobado que las habilidades que los jóvenes tienen con los computadores constituyen una variable explicativa importante para conseguir un empleo (según indica la publicación 2, incluida en el Capítulo 4, sección 4.2, explicarían el 40% de la empleabilidad de los jóvenes en la Unión Europea).

Por otra parte, aunque se ha comprobado una cierta homogeneidad en para toda la Unión Europea, se han puesto de manifiesto algunas diferencias en puntos muy importantes, en concreto, en la valoración que las habilidades en TICs tienen para la empleabilidad y en la concienciación sobre la importancia de mantener una capacitación y formación continua en las habilidades con computadores a lo largo de la vida, como el aprendizaje continuo a lo

largo de la vida. Son los jóvenes que viven en los países de la Eurozona los más concienciados en ambos aspectos.

En términos generales, las ciudades inteligentes, constituyen un espacio inclusivo, consciente de la importancia de las TICs y de la formación de los jóvenes que promueven tanto su empleabilidad como su inclusión social. En este sentido, serán entornos adecuados para evitar que los jóvenes con más dificultades, puedan evitar caer en el desánimo y pasar a formar parte del grupo conocido como NINIs.

El tercer artículo incluido en esta tesis (correspondiente al Capítulo 5) analiza precisamente los factores explicativos de la incidencia de este fenómeno en la Unión Europea, concluyendo que el entorno socioeconómico y las políticas sociales son muy importantes para evitar el desánimo de los jóvenes y su alejamiento del mercado de trabajo. Se ha comprobado que las condiciones marcadas por las variables macroeconómicas del país son menos influyentes en el porcentaje de NINIs que las condiciones sociales (los resultados de la tercera aportación, presentada en el capítulo 5, han mostrado que las condiciones económicas no se muestran estadísticamente significativas para explicar la incidencia del número de NINIs en el entorno de la Unión Europea).

Teniendo en cuenta que el bienestar social es el objetivo último. La última publicación (capítulo 6) incorpora variables transversales relacionadas con políticas específicas dirigidas a grupos vulnerables, como son la perspectiva de género y la influencia del bienestar en el trabajo en el bienestar general. Se analizan los efectos de la aplicación de la ley de igualdad promovida en España sobre el bienestar en el trabajo. En el estudio del caso planteado para la aplicación de los planes de igualdad en un ente público en España, se ha comprobado que hay dos factores importantes explicativos del bienestar en el trabajo: la igualdad percibida y el acceso a la formación en el trabajo, de forma que cuanta mayor igualdad se percibe en el trabajo y más facilidades para formación se encuentran, mayor es el bienestar percibido en el entorno laboral y cuanto mayor es este último también mayor es el bienestar general. Este resultado remarca la importancia de las políticas promotoras del apoyo a grupos laboralmente menos favorecidos como medio para aumentar el bienestar.

7.2. Conclusiones finales

En esta tesis doctoral se ha propuesto el estudio del desempleo juvenil en el marco de la Unión Europea. Una vez analizados los factores esenciales que pueden influir en el mismo se plantean cuatro ensayos, presentados en tres capítulos, correspondientes con los capítulos 4, 5 y 6 de esta tesis doctoral. En ellos se estudian factores relacionados con la sociedad del conocimiento en la que los jóvenes están inmersos. Por una parte, en los trabajos "A new educational pattern in response to new technologies and sustainable development. Enlightening ICT skills for youth employability in the European Union" y "Smart Cities for wellbeing: Youth employment and their skills on computers", presentados en los capítulos 4.1 y 4.2., se ha constatado la importancia de la formación en TICs en el empleo juvenil en la Unión Europea y el entorno creado por las ciudades inteligentes para conseguir la empleabilidad, que se ha demostrado que constituyen dos puntos de vista complementarios sobre los conocimientos y habilidades en TICs y uso de computadores como medio para la inclusión laboral de los más jóvenes en el contexto de la Unión Europea. Estos resultados concuerdan con la literatura académica, por ejemplo (Ruesga Benito et al., 2014) han comprobado la importancia de la irrupción de entornos tecnológicos altamente cambiantes, especialmente en lo referido a las tecnologías de la información y la comunicación (TICs) y a las turbulencias en la evolución de la economía globalizada, marcadas por los ciclos económicos y que afectan al estado del bienestar en general y al mercado de trabajo en particular.

En el capítulo quinto se ha comprobado la influencia del entorno económico y del entorno social como factores explicativos del número de jóvenes que han caído en el desánimo y no participan ni en la educación ni en el empleo. En la explicación de la incidencia del fenómeno NINIs en la Unión Europea, se muestra como mucho más relevante el entorno socioeconómico, y por tanto las políticas de apoyo social existentes, que el marco macroeconómico, lo que, conjuntamente con los resultados de las otras investigaciones aquí presentadas, refuerza la idea de la importancia de la gestión de políticas inclusivas, especialmente en el marco educativo y de las TICs. Al igual que con los trabajos presentados en las dos secciones de consta el capítulo cuarto, también los resultados obtenidos se han mostrado en consonancia con los estudios académicos previos. Por

ejemplo, la investigación de Refrigeri y Aleandri (2013) indica que los modelos sobre las transiciones de los jóvenes de la educación al mercado laboral están más cerca de los modelos educativos que del entorno macroeconómico del país específico.

Finalmente se presenta un cuarto ensayo, que constituye el capítulo sexto, en el que se realiza una encuesta para evaluar los sentimientos y percepciones dentro de los espacios laborales, cuando se aplica una política favorecedora de la igualdad, la conciliación y el apoyo a un grupo vulnerable, como es el de las mujeres. En este capítulo se han analizado los sentimientos de las personas trabajadores y se han relacionados con el bienestar laboral y social, así como con los efectos de las políticas laborales inclusivas aplicadas en el entorno laboral. Por tal motivo se ha hecho el estudio de un caso y ha sido necesario realizarlo entre las personas empleadas, precisamente para poder valorar la situación en dentro del entorno laboral.

El conjunto de estos ensayos permite alcanzar conclusiones generales, en base a las alcanzadas en cada uno de ellos, interpretadas de forma conjunta. En síntesis, estas conclusiones son:

- La educación en TICs es fundamental para que los jóvenes de la Unión Europea puedan conseguir un empleo
- La educación informal es más efectiva que la educación formal para que los jóvenes de la Unión Europea puedan conseguir un empleo.
- La capacitación en el uso de ordenadores aumenta las posibilidades de conseguir un empleo para los jóvenes que viven en la Unión Europea.
- La educación informal y la formación continua, no sólo favorecen la empleabilidad de los jóvenes, sino que, una vez que consiguen un trabajo, aumenta en bienestar en el entorno laboral y, en consecuencia, su bienestar general.
- Las políticas favorecedoras de la igualdad mejoran el bienestar percibido en el puesto de trabajo y también el bienestar general.
- Las políticas sociales son más influyentes para disminuir el número de NINIs que un entorno macroeconómico favorable.
- Los jóvenes pertenecientes a la Euro Zona son más conscientes de la importancia tanto de la capacitación en el uso de computadores como en el conocimiento y

habilidades con las TICs, que los que europeos que no pertenecen a dicho espacio dentro de la Unión Europea.

Como corolario o conclusión global se podría decir que la formación continua en TICs y habilidades con los computadores es importante para lograr un empleo, para sentirse mejor en el trabajo y para aumentar el bienestar general. Los entornos inclusivos creados por las Smart Cities, junto con las políticas laborales promotoras de la igualdad y la inclusión de grupos vulnerables son un apoyo esencial para la empleabilidad y el bienestar de los jóvenes y de las sociedades. Teniendo en cuenta, además, que las políticas sociales son más efectivas para minimizar la incidencia del desánimo en los jóvenes, la conclusión principal de este trabajo apunta a la recomendación de diseño de políticas inclusivas de formación continua en TICs, principalmente mediante enseñanzas informales, conjuntamente con políticas laborales favorecedoras de la igualdad y de la integración de grupos vulnerables en el entorno laboral. De este modo no sólo se favorecería el empleo de los jóvenes y se minimizaría el fenómeno “NINIs”, sino también el bienestar laboral y el bienestar social.

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8. ANNEX: Original Published Papers – ANEXO: Publicaciones Originales

PUBLICATION 1

Telematics and Informatics 35 (2018) 1031–1038

Contents lists available at ScienceDirect

Telematics and Informatics

journal homepage: www.elsevier.com/locate/tele

A new educational pattern in response to new technologies and sustainable development. Enlightening ICT skills for youth employability in the European Union

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ARTICLE INFO

Keywords:
ICTs education
Youth employment
Higher education
Structural equation modelling

JEL Classification:
I2
J2

ABSTRACT

The so-called fourth revolution is underway and its impact is appreciated in societies and in the way of life of people, particularly due to its effects on the labor market. The disruption generated by the fast changes point out to the immediacy of the needed changes in higher education for responding the new and changing world. The millenarians or digital natives are already used to living with technology, but the technological changes are so fast that if they do not prepare to face them, they will become obsolete soon. Hence the importance of continuous training and the need for institutions and companies to promote training courses for their employees. The higher education institutions have a key role on the promotion of knowledge and on the innovation, but this new scenario is an unexpected challenge that is difficult to face. Incorporating teaching of information and communications technology in universities within the curriculum, as a cross-training topic, is a difficult but necessary challenge for preparing students for success in labor market. In this paper, the importance of training in ICTs to get a job is raised. An empirical study with EUROSTAT data is carried out and is limited to young people between 16 and 24 years old. Structural Equation Modelling is the applied method. The results indicate that informal ICTs training favors employment and training in computer management. The conclusions point to the need to providing channels of self-training or informal personal training to fit the needs and temporal and spatial availability of each.

1. Introduction

From the eighteenth century, the industrial revolution, radically transformed life at a planetary level. The three phases of the industrial revolution were continued with the forth revolution. The quick advances on Information and Communications Technologies (ICTs) drafts nowadays something similar with the extent of the internet, virtual environments, robotics, and artificial intelligence, but these new changes are probably are coming more, and more promptly, shaping a new industrial revolution of greater disruptive force than it could be initially expected. As World Economic Forum stated, in 2005, there were just 500 million devices connected to the Internet; today there are 8 billion, and it's estimated that by 2030 there will be 1 trillion (World Economic Forum – WEF, 2016). The innovation era is now, and it should start focusing on people. Despite the robotics importance on new production systems, the human capital is decisive within the workforce, and, in a fast-changing knowledge economy, 21st century digital skills drive organizations' competitiveness and innovation capacity (van Laar et al., 2017). In this context, Universities have to face

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http://dx.doi.org/10.1016/j.tele.2017.09.014
Received 22 May 2017; Received in revised form 5 July 2017; Accepted 28 September 2017
Available online 30 September 2017

disruptive environments due to ICTs revolution, both as teaching and learning tool and as a new and crucial subject to teach for giving an integral formation to the students, who are mainly the so called "millennial generation" (the first generation borne immersed in new technologies). Davies et al. (2011) pointed out that success in the labor market is linked to the new media literacy and virtual collaboration, since they are two of the crucial skills that will be needed in the future workforce. In this field, younger individuals are the best performed for becoming Technology-Savvy Employees. The millennials are strongly skilled in these new communication and information technologies and they feel comfortable in virtual environments. This ICTs skills gives them a comparative advantage for social networking and their confidence on virtual collaborative atmospheres gives them the opportunity of integrating these productivity-enhancers into their work. In this sense, their particular innate conditions are in favor to their fast adaptation to technological changes and to quickly familiarize to self-learning digital environments.

The changing pedagogical models and the incorporation of Knowledge innovation is essential for universities survival. Milosevic et al. (2015) stated that Global network for higher education is not a fantasy and that leading scientists have begun to implement elements of research in teaching, because they know that universities and their colleges cannot exist separately from the social and technological environment, that is to say, from the current moment, so they must make progress in wider educational strategy of knowledge production. The main goal of universities is providing a solid and operative formation to their students, which lead them to achieve success in their personal and professional lives, as well as bring the results back to society in terms of general welfare. One main step for achieving this goal is to give to the university students' actual opportunities for getting a good job, since current trends reveal that it is not only the quantity of jobs but also the quality of jobs that matters, as few youth have access to productive employment opportunities that provide them with a decent wage, job security and good working conditions (International Labor Organization, ILO, 2017). Youth employment remains a global challenge and a top policy concern worldwide. The attendance to the university makes individuals more competitive in labor market, since university-educated youth are more likely to attain their desired job on their first try, but the changes introduced by the fourth revolution have to be assumed for a complete success at the university level. Growing up in the center of fast technological changes and globalization, today's youth are already expert on walking through unpredictable times and actually ready for assuming all kind of vicissitudes (Elder and Rosas, 2015). Since youth employment is a top policy concern, this paper deals with the importance of ICTs skills for getting a job.

After this introductory section, this paper analyzes the literature for focus the theoretical framework, attending the importance of ICTs both in education and in the labor market, and it stablish the main objectives of this work. The third section explain the material and methods and the results are shown in section four. The last section summarizes the main conclusions. The output of the computation with the results is shown in Annex.

2. Technology, higher education and labor market

Disruptive changes to business models will have a profound impact on the employment landscape over the coming years (World Economic Forum, 2016). The technological changes high speed is out of doubt, the spread of the internet worldwide took only seven years. In addition, it cost decreases continuously. The Citi GPS Disruptive Innovations III report argued that stated that the cost of innovation extent, by means of the internet, continues to fall, as an example the cheaper smartphones, which will help bring four billion more people online. Over 96% of institutional clients who participated in Citi's survey on technology and work believe that automation will accelerate over the next five years vs. the previous five years (Citi, 2016). The world economy has greatly benefitted from technological advances. These advances have had important effects on the labor market. The impact of ICTs on labor market shows significant differences across countries and over time. Nevertheless, only some particular kind of jobs can be done by machines, then there are some skills which reinforce the employ maintenance (Peng et al., 2017).

On the other hand, the society of knowledge is related to the sustainable development from a global perspective, since social sustainability is one of its pillars. Sustainable development is a general objective all over the world. This goal should be contextualized and properly balanced between all its areas. The triple bottom line (Brundtland, 1987) points to the three pillars for sustainability: environmental, economic and social and sustainability are all of them key pillars for achieving this goal. Moreover, the greater economic self-reliance of territories, supported by ICTs, can benefit both environmental sustainability and work opportunities (Robertson, 1995). The welfare of societies, employment and sustainability are wide and interrelated goals (Pociovalisteanu et al., 2015) and closely related to society and people way of life (Novo-Corti et al., 2015). This interconnection is reinforced by globalization and Technologies of Communication and Information spreading, which should be accessible for everybody, and that is why the plenty access to the internet, both technical and economic, is an objective for policy makers (Alam, 2017; Leung and Zhang, 2017; Novo-Corti and Barreiro-Gen, 2015). Relating to the education and training, they will need to respond to the growing significance of the environment, of sustainable local economies, and of sustainable household management, as well as to the growing importance of ICTs (Robertson, 1995). Sustainable higher education environments are wider than just a high-quality educative contents (ie. generating inclusive environments, (Novo-Corti et al., 2015)) and its scope goes beyond the time at the University, because it influences people performance and wellbeing all along their lives.

2.1. Education and skills in the 21st century

The education has ever been a key factor for achieving an employment. In the fourth industrial revolution era, the advances in technology are making a broader range of non-routine tasks automatable, with computers replacing mostly low-income low-skilled workers in the coming decades (Citi, 2016). The greater level of education of a country the highest level of per capita income, because, a greater level of education results in higher labor productivity, and a greater level of education in the whole society tend to

Table 1
Digital skills.

Framework with 21 st-century digital skills	
Core skills	Contextual skills
Technical	Ethical awareness
Information management	Cultural awareness
Communication	Flexibility
Collaboration	Self-direction
Creativity	Lifelong learning
Critical thinking	
Problem solving	

Source: Adaptation from van Laar et al. (2017).

boost a higher rate of aggregate growth (Goldin and Katz, 2009). The key issue in the context of the fourth revolution, the one of knowledge and technology, to focus properly the adequate type of knowledge that colleges and universities should offer to respond the companies and societies demand on skilled knowledge. Most of these skills are under the umbrella of the so called digital competences, which are a set of different skills for achieving a good performance on digital society and which is a multi-faceted moving target, covering many areas and literacies and rapidly evolving as new technologies appear. Ferrari (2012) understand the Digital Competence as the convergence of multiple areas, related to the ability for understanding media, searching for information from a critical point of view and being able to communicate by means of various digital tools and applications (mobile, internet). Thon, for achieving these abilities is necessary to handle different disciplines and getting some competencies related to digital literacy. Facing this challenge is one important issue for Universities nowadays. Nevertheless, it seems to be very difficult to take this renewal from the traditional curricula perspective. Van Laar et al. (2017) have identified seven core skills for success in (technical, information management, communication, collaboration, creativity, critical thinking and problem solving) and five contextual skills (ethical awareness, cultural awareness, flexibility, self-direction and lifelong learning) (Table 1) and they point out that the dynamic changes in the types of jobs demanded by the knowledge society pose serious challenges to educational systems, as they are currently asked to prepare young people for jobs that may not yet exist.

The European Centre for the Development of Vocational Training (CEDEFOP) assessed that in the European Union nearly half of the new job opportunities will require highly skilled workers (Citi, 2016). Improving education and training are key issues. They should be ready to prepare people for their personal as well as vocational life, in the context of globalized economies, international competitiveness, and ICTs era, where sustainable development should be achieved. This improvement of education should focus not only on vocational preparation, but also on personal preparation, not only for the information age, but also for sustainable development, and for constructive and useful participation in society, household and family" (Robertson, 1995). Long-life learning and training become core issues for getting a whole educative context. Lifelong learning is a continuous, voluntary, and self-motivated act to expand one's own knowledge (Kaur and Beri, 2016). The self-learning and personal implication on informal education come into the scene as an important player. Particularly, attending the fast changes in the knowledge society and the difficulty of assuming these changes by the traditional academic curricula. It has been proved (Chuang, 2017; Hsiao et al., 2017; Milosevic et al., 2015; Novo-Corti et al., 2013), that there is a wide range of possibilities for introducing the informal ICTs environments in formal education, in a simple way, more as a tool than as specific curricula content. Then, "learning by doing" gives a strong support for acquiring ICTs competencies as well as for improving students' performance in the typical curricular subjects. As a consequence, their integral technological knowledge and competencies will probably fit better with labor market exigencies. The innovative employability structure suggests that with the enhanced prevalence of ICT a wide array of individual factors impinges on employability (Green, 2017). Hasanefendic et al. (2016) argue that the actual policy discourse is increasing the pressure on higher education institutions for attending the claims of employers and their results indicates that best learning practices can have a potentially central role in minimizing the skill/labor market mismatch and that developing modern pedagogies could diminish the closure of the skill/labor market gap.

Required skills in the labor market are changing quickly, but computing systems are also changing at the same speed, so it would be possible understanding and anticipate these changes in labor markets in near-real time, and trying to re-shape education and training policies in a timelier manner to help to narrow the widening skills gap (World Economic Forum, 2016). Handling the resources for adapting the education to this changes is an important task for policymakers.

2.2. ICTs and employment

The extent of technological change is growing. The big data revolution and advances in machine learning algorithms indicates that the occupations that can be replaced by technology are also increasing, and this includes those tasks that were once thought just for humans, such as driving a car or interpreting handwriting (Citi, 2016). Rifkin (1995) stated that the technological advances lead to entering into a new phase in world history: one in which fewer and fewer workers will be needed to produce the goods and services for the global population, but it is only one part of the history. Technological advances have allowed the robotization of certain tasks, where people are replaced by machines. However, robots cannot replace people in skilled jobs. Rifkin words should be interpreted in

its proper context, but the importance of the phenomenon should not be undervalued, since in the OECD the data shows on average 57% of jobs are susceptible to automation, this number rises to 69% in India and 77% in China (Citi, 2016).

Actually, some jobs may be diminished, but others will increase: who will manufacture the robots? On the other hand, information and communication technologies (ICTs) have largely freed employees from the restrictions of a fixed, central work place, enabling mundane tasks to be distributed across remote locations, and these advancements make possible for corporations implementing flexible policies that allow employees to arrange their work and family concerns autonomously (Leung and Zhang, 2017). The core of this work is not addressed to the discussion about the advancements on ICTs and its effects and their assessment on the labor market, but it is important to be aware of the extent and importance of this issue. This work analyzes the relation on ICTs knowledge and the employment for young people in the European Union, since it is a key factor for understanding the disruption of higher education in the 21st century due to ICTs and its effects on students' employability and their possibilities of getting a decent work. Because, scaling up investments in decent jobs for youth is the best way for ensuring young people to achieve their aspirations and actively participate in society. It is also an investment in the well-being of societies and inclusive and sustainable development (Elder and Rosas, 2015). Moreover, there is a growing divergence in earnings between the most-educated and least-educated workers. The more skilled workers have the highest wages, despite that the supply of educated workers has also increased, which is a sign of the increase in the relative demand for skilled labor. On the other hand, those with the least education, who typically already had the lowest wages, this change has increased overall income inequality (Brynjolfsson and McAfee, 2011).

Technological advancements together with the globalization are meaningfully transforming work. However, education and training systems, having remained mostly static and under-invested in for decades, are largely inadequate for these new labor markets" (WEF, 2016).[1] Taking into account the current socioeconomic environment and the academic literature on this subject, it is verified that the training (formal and informal education) in ICTs is a fundamental aspect to find a job. Hence, the hypotheses to be contrasted in this work are those included in Table 2 and refer to the positive influence on the employment of such training. Four hypotheses are being tested: Two of them related to the influence of ICTs education on employment and other two related to the influence of ICTs education on Computers Skills. In addition, the formal and unformal education influence was considerate separately (see Fig. 1).

3. Material and methods

Since the main goal of this paper is to analyze the influence of ICTs education on employment and Computers Skills in the European Unión for the youth, the data source was EUROSTAT, particularly the Youth data from the section Population and Social Conditions. Following EUROSTAT methodology, youth are considered those people between 15 and 24 years. All data are referred to that age range. Structural Equations Modelling is the most suitable method for assessing causal relations among unobservable variables. This method was proved as very effective for analyzing the ICTs use, impact and influence in education, from different perspectives (Lee et al., 2017; Milosevic et al., 2015; Varela-Candamio et al., 2014).

For testing causal relations a linear regression analysis is the proposed method. Nevertheless, since the involved variables are not directly measurable, the most suitable method for performing this analysis is the structural equation modelling, which lets the "construction" of those latent variables (or "constructs") by means of confirmatory factorial analysis, and, at the same time, is suitable for explaining causal relations between the latent variables. The IBM SPSS Statistics and AMOS 21 was the utilized software.

The Structural Equation Modelling has two main components: the measurement model and the structural model, for assessing the latent variables construction and the causal relations, respectively. The latent variables in the proposed model are the ICTs Formal Education (ICTsFE), the ICTs Unformal Education (ICTsIE), the Employment and the Computers skills. It is convenient to notice that the variable "Employment" could be taken as an observable variable, but to capture desegregate information related to education and employment, the variable was "constructed" taking account the different employment rates for the three educational levels. The latent variables for the model and their indicators are shown in Table 3. Moreover, information about the particular item of the database is also provided.

4. Results

The Structural Equation Modelling, related to the measurement model, indicates that the estimated coefficients for the indicators, which are constructing the latent variables, are all statistically significant ($p < .05$), then we conclude that this significance of parameters indicates that the proposed relationship between analyzed variables has a substantial effect on the latent variable.

The equations for the measurement model (standardized estimates) are:

$$x_{11} = 0.28\xi_1 \quad (1)$$

$$x_{21} = 0.96\xi_1 \quad (2)$$

$$x_{31} = 0.61\xi_1 \quad (3)$$

$$x_{41} = 0.93\xi_1 \quad (4)$$

[1] https://www.weforum.org/system-initiatives/education-gender-and-work.

Table 2
Hypotheses.

Hypotheses
H1: ICTsFE positively influences on youth employment in the European Union
H2: ICTsIE positively influences on youth employment in the European Union
H3: ICTsFE positively influences on youth Computers Skills in the European Union
H2: ICTsIE positively influences on youth Computers Skills in the European Union

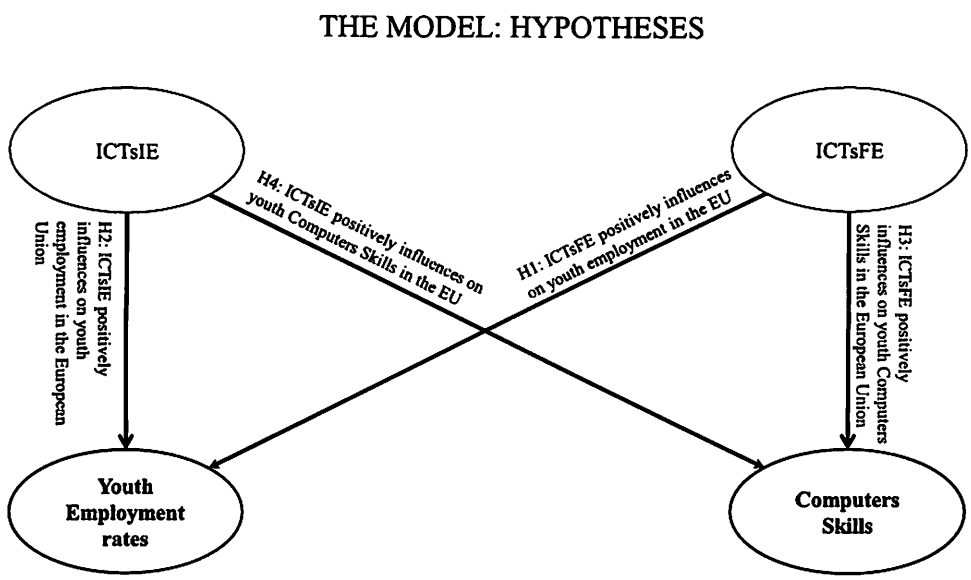

Fig. 1. The proposed model and the Hypotheses.

Table 3
Latent variables and indicators.

Latent Variable	Item	Content
ICTsFE	High Education	Individuals with high education (levels 5–8) who have obtained IT skills through formalized educational institution (school, college, university, etc.)
	Medium Education	Individuals with medium education (levels 3–4) who have obtained IT skills through formalized educational institution (school, college, university, etc.)
	Low Education	Individuals with low education (levels 1–2) who have obtained IT skills through formalized educational institution (school, college, university, etc.)
	ICTsFE Males	Males who have obtained IT skills through formalized educational institution (school, college, university, etc.)
	ICTsFE Females	Females who have obtained IT skills through formalized educational institution (school, college, university, etc.)
ICTsIE	Self-Training	Individuals who have obtained IT skills through self-study (learning by doing)
	Adult Education	Individuals who have obtained IT skills through training courses and adult education centers
COMPUTERS SKILLS	For Job	Individuals who judge their current computer or internet skills to be sufficient if they were to look for a job or change job within a year
	For Computer Protection	Individuals who judge their current computer or internet skills to be sufficient to protect their personal data
	For Data Protection	Individuals who judge their current computer or internet skills to be sufficient to protect their private computer from virus or other computer infection
EMPLOYMENT	Primary Education	Employment of people 15–24 years for low education level (0–2)
	Secondary Education	Employment of people 15–24 years for medium education level (3–4)
	Tertiary Education	Employment of people 15–24 years for high education level (5–8)

$$x_{51} = 0.99\xi_1 \tag{5}$$

where:

ξ_1 = *ICTsFE*,
x_{11} = Individuals with high education (levels 5–8) who have obtained IT skills through formalized educational institution (school,

college, university, etc.),
x_{21} = Individuals with medium education (levels 3–4) who have obtained IT skills through formalized educational institution (school, college, university, etc.),
x_{31} = Individuals with low education (levels 1–2) who have obtained IT skills through formalized educational institution (school, college, university, etc.)
x_{41} = Males who have obtained IT skills through formalized educational institution (school, college, university, etc.)
x_{51} = Females who have obtained IT skills through formalized educational institution (school, college, university, etc.)

$$x_{12} = 0.69\xi_2 \tag{6}$$

$$x_{22} = 0.66\xi_2 \tag{7}$$

where:

ξ_2 = *ICTsIFE*,
x_{12} = Individuals who have obtained IT skills through self-study (learning by doing),
x_{22} = Individuals who have obtained IT skills through training courses and adult education centers

$$y_{11} = 0.81\eta_1 \tag{8}$$

$$y_{21} = 0.92\eta_1 \tag{9}$$

$$y_{31} = 0.74\eta_1 \tag{10}$$

where:

η_1 = *Employment*,
y_{11} = Employment of people 15–24 years for low education level (0–2)
y_{21} = Employment of people 15–24 years for medium education level (3–4)
y_{31} = Employment of people 15–24 years for high education level (5–8)

$$y_{12} = 0.59\eta_2 \tag{11}$$

$$y_{22} = 0.90\eta_2 \tag{12}$$

$$y_{32} = 0.97\eta_2 \tag{13}$$

where:

η_1 = *Employment*,
y_{11} = Employment of people 15–24 years for low education level (0–2)
y_{21} = Employment of people 15–24 years for medium education level (3–4)
y_{31} = Employment of people 15–24 years for high education level (5–8)

The assessment of the measurement model (see Table 4) is according to the literature scores for considering it adequate.

The reliability and internal consistency of the model, was tested by means of composite reliability and variance extracted values. Composite reliability (CR) should take scores ≥ 0.5 (Bagozzi and Yi, 1988) for confirming the internal consistency of constructs. Discriminant validity, for measuring the accuracy with which the analysis instrument represents the variables, the average variance

Table 4
Results for the measurement model.

Latent Variable	Observable Variable	Squared Multiple Correlations (λ^2)	CR
ICTsFE	High Education	0.079	0.756
	Medium Education	0.922	
	Low Education	0.377	
	ICTsFE Males	0.868	
	ICTsFE Females	0.991	
ICTsIE	Self-Training	0.746	0.674
	Adult Education	0.432	
COMPUTERS SKILLS	For Job	0.586	0.900
	For Computer Protection	0.974	
	For Data Protection	0.900	
EMPLOYMENT	Primary Education	0.657	0.823
	Secondary Education	0.848	
	Tertiary Education	0.545	

Table 5
Results for the structural model.

Dependent Variable	Independent variable	Estimator	Standardized Estimator	S.E.	C.R.	P	R^2 (fitted)
Employment	ICTsIE	4.208	0.643	1.704	2.469	0.014	0.420
	ICTsFE	0.127	0.113	0.228	0.558	0.577	
Computer Skills	ICTsIE	5.285	0.848	1.711	3.089	0.002	0.751
	ICTsFE	0.238	0.222	0.234	1.015	0.310	

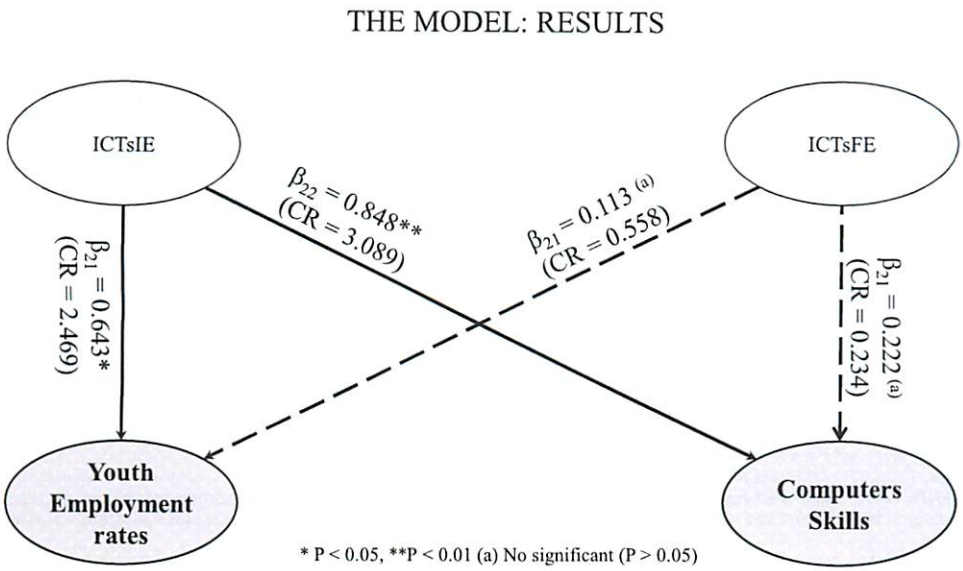

Fig. 2. The proposed model and the Hypotheses.

extracted (AVE) values exceed 0.5 score (Hair et al., 1999) are considered adequate. Al values are into the scores, except for the AVE for ICTsFE, due to the differences between the medium and the primary and high levels.

As regards the overall adjustment, the most common measures for global fitness of the model are the comparative fit index CFI and the χ^2. The CFI scores goes from 0 to 1, accepted values indicated that it should be as close as possible to 1, but it is acceptable CFI > 0.9. The Chi-Squared/Degrees of freedom score is 1.476. CMin = 88.546, DF = 60 and P-value = .010. The reference values are $0 \leqslant \chi^2/df \leqslant 2$ for a good fitting (Carmines and McIver, 1981).

The structural model results are shown in Table 5 and in Fig. 2. The main result is that the ICTsFE is not statistically significant for explaining Employment neither Computers Skills, whilst the ICTsIE is statistically significant for the explanation of both variables (Table 6).

Attending the results for structural model, shown in Table 5 and in Eqs. (14) and (15). The employment and Computer Skills are explained by means of ICTs education in a 42% and in a 75%, respectively. Taking account that the ICTsFE is not statistically significant for the explanation of none of these two latent variables (P-value .577 and .310, respectively), the relevant variable is the ICTsIE.

$$\eta_1 = 0.11\xi_1 + 0.64\xi_2 \tag{14}$$

$$\eta_2 = 0.22\xi_1 + 0.85\xi_2 \tag{15}$$

Table 6
Hypothesis testing.

Hypotheses	Result
H1: ICTsFE positively influences on youth employment in the European Union	No supported
H2: ICTsIE positively influences on youth employment in the European Union	Supported
H3: ICTsFE positively influences on youth Computers Skills in the European Union	No supported
H4: ICTsIE positively influences on youth Computers Skills in the European Union	Supported

5. Conclusions

Current debates about the employment impact of disruptive change have sometimes been divided between those who foresee unlimited opportunities in newly emerging job categories and diagnoses that this scenario will improve workers' productivity and release them from repetitive work, and those that anticipate massive labor substitution and displacement of jobs (World Economic Forum, 2016). This debate is also in academia (Smith and Anderson, 2014). Nevertheless there is a common agreement on the urgency of getting skilled workers for facing this disruptive changes. The role of education becomes once again a focal point on the debate. Therefore, education on ICTs is a key factor for youth getting an employment, but also for helping societies to face successfully the forth industrial revolution. Anticipating the knowledge of some of this key skills needs will enhance this success for people and for societies. The results of this research point clearly to the importance of boosting informal education on ICTs. Therefore, it would be interesting incentivize and enhance collaborative designs on education, labor and knowledge society public policies to be ready for the challenge.

The policy implications from these conclusions point to the importance of promotion of self-learning environments as well as the long-life learning in ICTs for achieving those competences suitable for increasing youth employability.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.tele.2017.09.014.

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PUBLICATION 2

Smart cities for wellbeing: youth employment and their skills on computers

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Received 24 April 2017
Revised 19 August 2017
Accepted 26 September 2017

Abstract

Purpose – Smart cities can be understood as an inclusive space for each and everyone to achieve their best options, within the framework of sustainable development, where institutions boost information and technology environments that help achieve the highest individual and social well-being with the aim of improving the lives of citizens. The youth group (between 15 and 24 years) was severely affected by the crisis. In this paper, youth employability, in relation to the new challenges of smart cities, is analyzed in the EU with the aim of assessing the influence of information and communication technologies (ICTs) skills on youth employability.

Design/methodology/approach – By means of a mean analysis and structural equation modeling, the differences between the Eurozone and the other countries in the EU is analyzed, as well as the importance of information technologies and the computer skills for increasing youth employability.

Findings – The results indicate that awareness of the importance of IT skills is greater in the Eurozone and that computer skills are highly significant to explain the employability of young people.

Practical implications – The achieved conclusions point out to the training on computers skills as a key factor for boosting youth employment.

Social implications – This work could provide some tools to help policymakers design instruments for increasing youth employment, as well as to provide training mechanisms to obtain the skilled workforce needed for the enterprises that emerged in the environment of smart cities.

Originality/value – The main original value of this work is to relate computers skills and the employment rates for youth in the framework of the European Union.

Keywords European Union, Smart cities, ICTs, Structural equation modeling (SEM), Youth employment

Paper type Research paper

1. Introduction

Sustainable development is related to social issues as well as environmental and economic ones. In addition, technological and communication issues are also closely involved in that they boost sustainability in all of these areas. "A Smart City is a city seeking to address public issues via ICT-based solutions on the basis of a multi-stakeholder, municipally based partnership" (European Union, 2014 Directorate General for Internal Policies. Policy Department A: Economic and Scientific Policy).

Another interesting definition can be found in Angelidou (2015), Komninos (2015) and Mora, Bolici and Deakin (2017). Smart cities are a key point for urban sustainable development, which is focused on achieving more inclusive, egalitarian and just societies,

Journal of Science and Technology Policy Management
Vol. 9 No. 2, 2018
pp. 227-241

2053-4620
DOI 10.1108/JSTPM-04-2017-0014

where the wellbeing of the people is the main objective. They target "smart" development by means of improving information and communication technologies (ICTs) in their area. The spread of ICTs aims to improve the wellbeing of people living in these urban areas by creating a "smart" environment accessible to everyone, which means achieving a more inclusive society. Then, it could be stated that achieving a more inclusive society could be considered one of the most important reasons for supporting the so called "smart cities". Despite the great differences on the definition about what a smart city is, there is a common agreement on their intrinsic character linked to sustainable development and ICTs for all, according EU 2020 goals (European Union, 2010). Actually, a smart life is the one that makes people feel and live better (Ho *et al.*, 2015). The literature on smart cities is wide and multidisciplinary (Bibri and Krogstie, 2017), and some authors underlined the importance of the integration of technical and social perspectives (Levy and Ellis, 2006; Webster and Watson, 2002). Some definitions are provided in Table I.

This is the "smart era" (Lyons, 2016), where a great number of devices around are called "smart". But the real smartness is not in the devices themselves, in fact, it is in the way they are used, to achieve well-being and avoid inequalities, exclusion and poverty. "Intelligent

Definition	Source
The use of smart computing technologies to make the critical infrastructure components and services of a city – which include city administration, education, healthcare, public safety, real estate, transportation and utilities – more intelligent, interconnected and efficient	Washburn *et al.* (2009). Helping CIOs understand "smart city" initiatives: Defining the Smart City, Its Drivers, and the Role of CIO. Cambridge, MS: Forrester Research, Inc.
A city well performing in a forward-looking way in economy, people, governance, mobility, environment and living, built on the smart combination of endowments and activities of self-decisive, independent and aware citizens	Griffinger *et al.* (2016). Smart cities-ranking of european medium-sized cities. Rapport technique, Vienna Centre of Regional Science
A city striving to make itself "smarter" (more efficient, sustainable, equitable and livable)	NRDC (Website: www.nrdc.org/)
A city that monitors and integrates conditions of all of its critical infrastructures, including roads, bridges, tunnels, rails, subways, airports, seaports, communications, water, power, even major buildings, can better optimize its resources, plan its preventive maintenance activities and monitor security aspects while maximizing services to its citizens	Hall (2000) The vision of a smart city. In Proceedings of th 2nd International Life Extension Technology Workshop (Paris, France, Sep 28)
An instrumented, interconnected and intelligent city	Harrison *et al.* (2010). Foundations for smarter cities. IBM Journal of Research and Development, 54(4), 1-16
A city that gives inspiration, shares culture, knowledge and life, a city that motivates its inhabitants to create and flourish in their own lives	Rios (2012). Creating "The Smart City" (Doctoral dissertation)
A city where ICTs strengthen the freedom of speech and the accessibility to public information and services	Partridge (2004). Developing a human perspective to the digital divide in the "smart city". The proceedings of the biennal company of the Australian Library and Information Association

Table I.
Some definitions of smart city

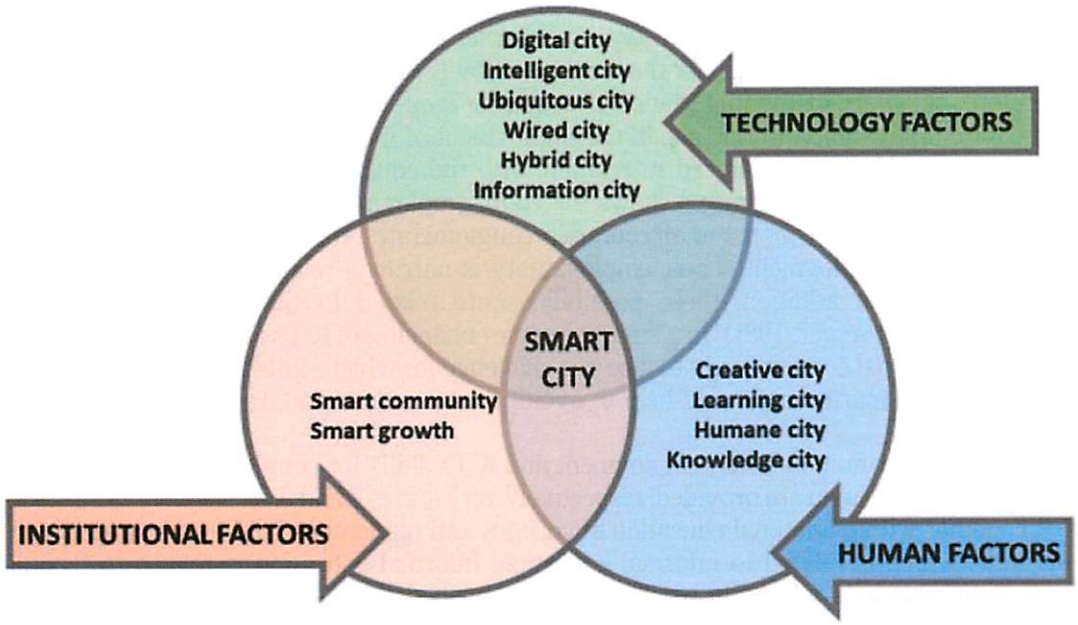
Source: Adaptation from Nam and Pardo (2011)

Communities are those which have –whether through crisis or foresight– come to understand the enormous challenges of the Broadband Economy, and have taken conscious steps to create an economy capable of prospering in it" (Intelligent Community Forum)[1].

There are some opinions about the origin of the concept of smart city. Gabrys (2014) stated that the germen of this kind of cities began to appear in urban development plans from the 1980s, but there is no a common agreement about this point. In addition, there is no clear conceptual framework for smart cities. "The label smart city is a fuzzy concept and is used in ways that are not always consistent" (Figure 1) (Hollands, 2008; Nam and Pardo, 2011).

In this paper, the smart city is understood as an inclusive space for each and every one to achieve their own options, within the framework of sustainable development, where institutions boost information and technology environments that help achieve the highest individual and social well-being. Then, everyone is able to achieve his or her best option to live.

Some nuances should be made on the concept of smart city, particularly about the concept of sustainable city. Sometimes such identification is not so clear and some additional investigation in this field should be done (Bibri and Krogstie, 2017). Taking account of the systematic perspective on and the universal character of sustainability, it is necessary to define a holistic and shared model of the smart sustainable city. In addition, it is important to explain its relation to inclusive societies for all, because it is the pillar for real sustainable development (Novo-Corti *et al.*, 2015). Then, these cities face the challenge of combining competitiveness and sustainable urban development simultaneously. Despite the great importance of technological dimension, the more important dimension of the concept of smart city is improving wellbeing for all its inhabitants. Intellectual social capital are fundamental pillars for smart cities. It allows developing human potential by means of promoting education and getting more skilled workers, and that is why these cities have



Source: Adapted from Nam and Pardo (2011)

Figure 1.
Fundamental components of a smart city

better educated people in a better endowed labor market: because of these high-skilled workers (Glaeser and Berry, 2006). Then the conjunction of knowledge, education and ICTs skills become key factors for analyzing all issues related to smart cities.

In difficult times for the economy, the response of smart cities, reinforcing social cohesion becomes essential. One of the population sectors more affected by the economic crisis are the youth (Scarpetta, Sonnet and Manfredi, 2010). Their opportunities were diminished because of the global economic situation, and some of them had to emigrate, others still remain unemployed and all of them are victims of this situation, that at the moment of writing this paper (2017) seems to be changing. Tackling youth unemployment is one of the main goals for smart cities (Monzon, 2015). This goal could be achieved by means of promoting informal courses in ICTs to increase ICT skills in youth. One key feature of smart cities is the increase in new spaces and workplace positions which are an advantage for the youngest who have to previously acquire those skills for offering their workforce in these new positions (López-Arranz, 2017).

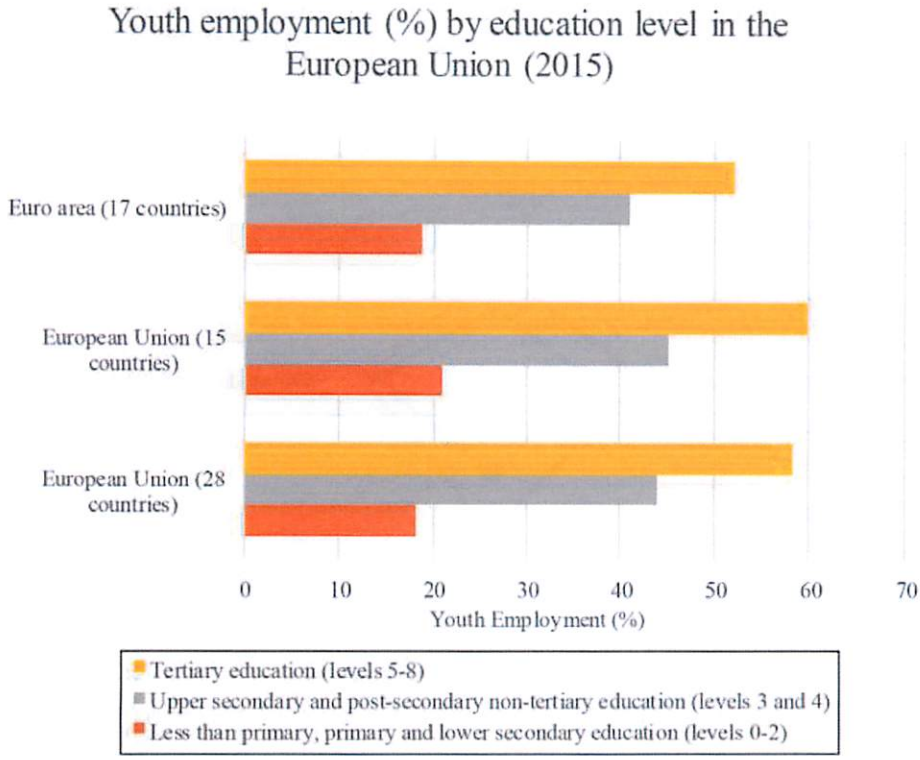
In this paper, youth employment from 15 to 24 years in European Union is analyzed related to their ICTs knowledge. In the first section, the main concepts and hypotheses are shown. In the second one, the method is explained, and the third explains results and discussion. The last section summarizes some conclusions and provides some reflections that may support policymakers in their decision-making process.

2. Labor market and information and communication technologies competences in youth aged 15-24 in the EU

The main trends of the new labor structure in rent years was analyzed by (Castells, 2011), who indicates that youth labor possibilities will be in a dual labor market context, which is characterized, on the one hand by its growing flexibility of labor as well as a smaller portion of long-term employed workers, who will have an unpredictable career path, then, the youth will face a more flexible and insecure context. But, on the other hand, there will be a simultaneous growth in highly educated occupations these workers will be the educated knowledge workers so valuable for their companies, that they will be often referred to as "talent" (Castells, 2011). Then, two types of workers will appear: the "self-programmable labor" and "generic labor", as per the label given by (Castells, 2011). Young people should, therefore, be aware of the importance of acquiring cross-cutting ICT skills, as it is a key issue for employability. In this paper, the employment of youth between 15 and 24 years in the European Union is analyzed in relation with the education level and their skills on computers and internet. Figure 2 shows the youth employment (15-24 years) by education level in the European Union. For all countries' conglomerates, the higher the education level, the higher the employment. Thus, employability is narrowly related to education (López-Arranz, 2017). In addition, these possibilities are related to the requirements of the companies (Rumberger, 1981). In a smart city, the enhancing of ICTs and their use will need an entrepreneurial context ready to face this challenge for which skilled workers are needed. In addition, a smarter city could help to avoid involuntary migration flows (Visvizi *et al.*, 2017).

Some information on youth employment and ICTs skills for conglomerates of countries in the European Union are provided, respectively, on Figures 2 and 3.

Together with traditional education at colleges and universities, there is another source of skills, which is related to informal education. Informal education is related to flexible educative processes which do not have pre-established time; are capable of adapting to particular interests (Dib, 1988) and involve any activity pursuing the understanding, knowledge or skill outside the curricula of educational institutions (Livingstone, 1999). This



Source: Own elaboration from EUROSTAT data

Figure 2.
Youth employment (15-24 years) by education level in the European Union (2015)

source of skills is particularly interesting for these subjects belonging to the area of the IT. In the information era, these requirements are changing so fast that sometimes traditional education environments can provide this knowledge (Brynjolfsson and McAfee, 2012). On the other hand, the "learning by doing" is a key factor for acquiring skills on ICTs and computers (Schugurensky, 2000). Figure 3 shows the EUROSTAT data for youth between 15 and 24 years old according to their self-assessment of their internet and computer skills and their IT skills obtained through a formalized educational institution.

These two indicators show lower levels for the Eurozone; that can be interpreted in two different ways: the youth are aware about their lack of IT skills (then it is a sign of that youth see the necessity of improving) or that the young people in the Eurozone really are less skilled. Anyway, there are some differences between European countries that justify the comparative analysis. Youth employment rates are highest in the European Union (15 countries) for all educational levels, and lower in the Eurozone (17 countries). For the whole youth these rates are 41 per cent, 45.2 per cent and 43.9 per cent for Eurozone (17 countries), European Union (15 countries), and European Union (28 countries), respectively. The European Union (15 countries) comprises Belgium, France, Germany, Italy, Luxembourg, Netherlands, Denmark, Ireland, United Kingdom, Greece, Portugal, Spain, Austria, Finland and Sweden. With the expansion to new countries (Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia, Bulgaria, Romania and Croatia) the European Union has 28 Member States. The Eurozone was created in 1999. The 11 founding states were: Germany, Austria, Belgium, Spain, Finland, France, Ireland, Italy, Luxembourg, The Netherlands and Portugal. Since then, Greece (2001), Slovenia (2007), Malta and Cyprus (2008), Slovakia (2009), Estonia (2011), Latvia, (2014) and Lithuania (2015)

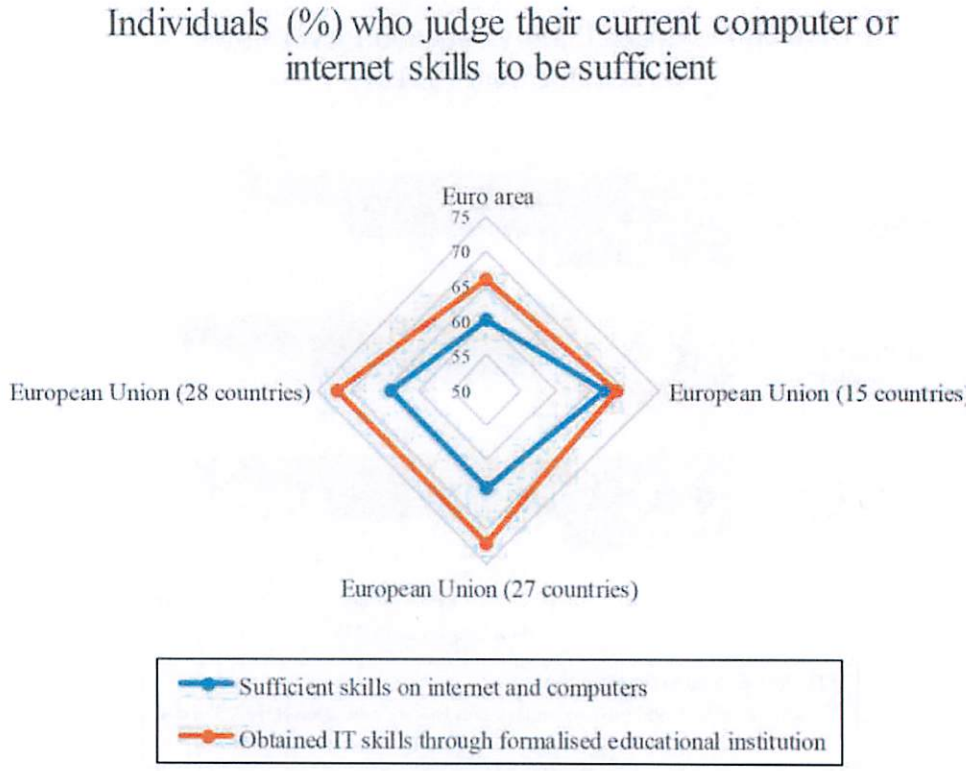


Figure 3.
Individuals (%) who judge their current computer or internet skills to be sufficient if they were to look for a job or change job within a year and who have obtained IT skills through formalized educational institution (school, college, university, etc.), (data 2011); people aged between 15 and 24 years

Source: Own elaboration from EUROSTAT data

have been incorporated. The 17 states that make up the Eurozone are: Austria, Belgium, Cyprus, Czech Republic, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, The Netherlands, Portugal, Slovenia and Spain. The youth employment rates reflecting the different situation in the Eurozone are mainly because of the effects of the economic crisis in this area. As can be seen by analyzing the situation in Greece, Portugal, Italy and Spain, these countries have suffered heavily from the impact of the economic crisis on their overall economy and on their employment rates in particular.

OECD states that the countries with well-established vocational and educational training (VET) and apprenticeship programs have been more effective in holding the line on youth unemployment (OECD, 2016). It is true that there are some opinions pointing out the employment destruction because of new innovative production processes and technological changes, but other opinions are just pointing to the opposite direction (Dachs *et al.*, 2017), on the other hand, nobody can be sure about the direction of changes in the future (Biagi and Falk, 2017). Nevertheless, to be willing to accept the technological changes and being proactive to getting skills for facing them, will help improve both personal and social positions in the near future. The changes in smart cities are a proof of this willingness in society and this is a great step to boost citizenship attitudes.

This paper focuses on the assessment of the youth situation in the European Union in the framework of smart cities and EU-2020 goals; more specifically, this paper analyzes their competences in ICTs and tries to find causal relations between their ICTs skills and their employability in the context of the European Union. Differences between the groups of

countries are analyzed. Two main research questions are specified and some hypotheses for helping to answering these research questions are specified:

RQ1. Are there differences between the groups of countries of the European Union according the youth adaptation to the digital world?

H1.1. There are differences between the Eurozone and the other European countries in awareness of the importance of IT for youth between 15 and 24 years.

H1.2. There are differences between the Eurozone and the other European countries in ICTs learning for youth between 15 and 24 years.

H1.3. There are differences between the Eurozone and the other European countries in internet use for youth between 15 and 24 years.

H1.4. There are differences between the Eurozone and the other European countries in computers use for youth between 15 and 24 years.

H1.5. There are differences between the Eurozone and the other European countries in the IT skills through learning for youth between 15 and 24 years.

RQ2. Is there a causal relation between computer skills and employability of youth aged 15-24 in the EU?

H2.1. Computer skills are not significant for explaining the employability of youth aged 15-24 in the EU.

3. Method

Smart cities promote a smart, inclusive and sustainable development and it requires a sustainable labor market. This paper analyzes youth employability focusing on their computer skills in the framework of the European Union. The research questions RQ1 and RQ2 are crucial for the knowledge of the geography of smart cities in Europe and the youth digital skills for the labor market.

The main innovation of this work is to test the influence of computer skills on the possibilities of obtaining a job among the youth in the European Union framework. The results achieved in this research can help managers of social and economic policies in decision-making. On the other hand, these results are especially relevant in the context of an intelligent city, where designing actions that encourage young people to increase their training in computers are essential. In addition, the conclusions of this work can be useful in promoting the development of a sustainable labor market, in the context of the objectives of smart, inclusive and sustainable growth in which smart cities are developed.

For testing *RQ1* of ICTs, a means comparison between the Eurozone and the other countries in the EU was conducted, as well as the previous Levene test for groups' equal variances. Additionally, a structural equation modeling method was applied for solving the *RQ2* (*RQ2*). This method is the adequate in this situation, because it is intended to assess a causal relation by means of a regression analysis with one dependent variable (the Computers skills) and other independent variable (The Computes Skills): this is the so-called "structural model". These variables are not easy to measure, because they are "constructs" or "latent variables", which are composited or constructed by means of several indicators, the relation between the latent and observable variables is in Table III.

SEMs are very valuable in this type of analysis, especially in two aspects. On the one hand, they allow working with variables that cannot be observed directly; in this research,

the variable "Computers Skills" because it is a multidimensional variable composed of very different aspects. Thus, in this work, this multidimensional variable can be "constructed" by its various components. On the other hand, the SEM methodology allows explaining the causal relationships between these latent variables. In our work, it allows us to answer *RQ2* (*RQ2*) which tries to test the causal relationship between the abilities of young people in computers and their employability.

The proposed method has to be analyzed taking into account three main issues: the global fit of the model, the structural and the measure models. The global fit of the model should be taken into account for assessing the model's adequateness and it has to give the satisfactory scores to test the global validity of the model. For this measurement, the minimum discrepancy rate (Chi-Squared/df) (Browne, 1982; Browne and Crudeck, 1993), the comparative fit index (CFI) (Bentler, 1980) and the root mean square error of approximation (RMSEA) (Browne and Cudeck, 1993) were analyzed and all results were plenty satisfactory, as can be seen in Table V. In addition, two are the models that should be analyzed: the measurement and the structural ones. The first one explains the causal relations between the latent variables, while the second one analyzes the reliability and internal consistency of the model, by means of the measure of the relation between each construct and its measurable indicators. The most commonly stated are the Cronbach's Alpha (Cronbach, 1951), the rate of composite reliability (Bacon *et al.*, 1995) and the extracted variance (Fornell and Larcker, 1981). The latent variables and their indicators are shown in Table II.

Data were obtained from the EUROSTAT (European Union, 2017), from the specific section about "youth" (yth) contained in the database "Population and social conditions". The EUROSTAT criteria are followed in this work for classifying the young people as "youth": they are those people between 15 and 24 years old. All data were updated at the most recent level provided by the European Union Statistics Office. The software was the IBM statistics SPSS 21 and the AMOS 21.

4. Results

For answering the *RQ1* a means comparison analysis was undertaken. Previous to the *t*-test, it is necessary to test equal variances between the groups by means of the Levene Test. The results of the calculation of this test are shown in Table III and indicate that equal variances should not be assumed because the null hypothesis is assuming equal variances and the *p*-value is lower than 0.05, so this null hypothesis should be rejected. Figure 3 displays the information about individuals (per cent) who judge their current computer or internet skills

Latent variable	Indicator
Computers Skills	Individuals who judge their current computer or internet skills to be sufficient if they were to look for a job or change job within a year
	Individuals who judge their current computer or internet skills to be sufficient to communicate with relatives, friends, colleagues over the internet
	Individuals who judge their current computer or internet skills to be sufficient to protect their personal data
	Individuals who judge their current computer or internet skills to be sufficient to protect their private computer from virus or other computer infection
Employment	Education attainment level 0-2
	Education attainment level 3-4
	Education attainment level 5-8

Table II.
Latent variables and indicators

Comparison between the Eurozone and the other member states of the EU	Levene test for equal variances		*t* test for equal means				
	F	Sig.	*t*	DF	Sig. (two tiled)	Means difference	Difference standard error
Individuals who have obtained IT skills through training courses and adult education centers, on own initiative	9.793	0.004	2.686	25,361	0.013	3.082	1.147

Note: Equal variances were not assumed

Table III.
Means difference test

to be sufficient if they were to look for a job or change job within a year and who have obtained ICTs skills through formalized educational institution (school, college, university, etc.), (data 2011); people aged between 15 and 24 years.

The comparison between the Eurozone and the other Member States of the EU has shown only differences for one item (Table III). The previous Levene test was conducted for analyzing the equality of variances, whose results indicate that equal variances should not be assumed.

For the item "Individuals who have obtained IT skills through training courses and adult education centers, on own initiative" the means are 6.526 and 3.444, respectively, then the difference is 3.082 and statistic significant (0.01).

For answering the *RQ2*, SEM was conducted. The results for the measurement model are summarized in Table IV. The measurement model analyzes the consistence of latent variables and their adequate measure, by means of their observable indicators. Then, the factor structure was tested of this model, by means of a confirmatory factor analysis, with the intention of checking the reliability and validity of the measurement scale, previously the factor loadings of all items was checked to proof the required minimum thresholds, which are usually accepted for <0.5, since all the results exceed these values, then the convergent validity of the scale is expected (Fornell and Larcker, 1981).

To check the reliability and internal consistency of the model, the Cronbach's alpha, rates of composite reliability and variance extracted values were calculated. The reference scores are: Alpha ≥ 0.7 (Anderson and Gerbing, 1988; Hair *et al.*, 1999), composite reliability (CR) should take scores ≥ 0.5 (Bagozzi and Yi, 1988) for confirming the internal consistency of constructs; for measuring the accuracy with which the analysis instrument represents the variables, the average variance extracted (AVE) values exceed 0.5 (Hair *et al.*, 1999). Each latent variable's AVE was larger than the squared correlation between each pair of latent

Latent variable	Item	λ	Cronbach's alpha	CR	AVE
Youth employability	1-2	0.674	0.876	0.685	0.825
	3-4	0.833			
	5-8	0.544			
Youth computer skills	Job	0.575	0.933	0.790	0.884
	Communication	0.712			
	Data Protection	0.950			
	Virus Protection	0.922			

Table IV.
The measurement model: Reliability and internal consistence of the latent variables

variables, thus demonstrating good discriminant validity of the scale (Fornell and Larcker, 1981).

To analyze the global fit of the model the more common indexes were analyzed, and its reference scores are shown in Table V. Our model has a good or acceptable fitting, according all indexes.

The reference values indicates that χ^2 values $1 \leq \chi^2 \leq 2df$ are compatible with an acceptable fitting (Carmines and McIver, 1981). In our model the interval is $1 \leq \chi^2/df = 1.136 \leq 2$. For the comparative fit index, is considered a good adjustment when $0.95 \leq CF \leq 1.00$, and acceptable for $0.94 \leq CF \leq 1.00$, due that the score in this model is 0.989, it is a very good fit. The typical range for TLI lies between zero and one, but it is not limited to that range (Bentler and Bonett, 1980; Bollen, 1989). TLI values close to 1 indicate an acceptable fit. The normed fit index (NFI) indicates a good fitting when $0.95 \leq NFI \leq 1.00$ and acceptable when $0.90 \leq NFI \leq 0.95$ (Bentler and Bonett, 1980; Bollen, 1989), this is the case of this model (0.982). The good and acceptable values for the Root mean square error of approximation (RMSEA) are $0.00 \leq RMSEA \leq 0.05$ and $0.05 \leq RMSEA \leq 0.10$, respectively, in this model the score is 0.071 (Browne and Crudeck, 1993; Steiger and Lind, 1980). Then, it is possible to conclude that, in general terms, the model is suitable for analyzing the proposed problem. Nevertheless, the scale of the fit indices is not always easy to interpret (Bentler and Bonett, 1980).

The structural model results are shown in Table VI and in Figure 4. This model is a linear regression analysis, but it also contains concatenated effects and loops between variables.

Employment is explained by computer skills, which is significant ($p < 0.001$) and the fitted R^2 is 0.399; thus, this model explains 40 per cent of youth employability according to their skills in computers.

5. Discussion and conclusions

The youth living in the Eurozone countries are sensible about the importance of being updated on IT knowledge because the means comparison results indicate that there are no differences between formal learning and other ways of training; nevertheless, there is statistic significant difference on the item "Individuals who have obtained IT skills through

Table V. Goodness of model fitting

Fit index	Score	Reference scores: Good	Reference scores: Acceptable
χ^2/df	1.136	$0 \leq \chi^2/df \leq 2$	$2 \leq \chi^2/df \leq 3$
CFI (Comparative fit index)	0.989	$0.97 \leq NFI \leq 1.00$	$0.95 \leq NFI \leq 0.97$
TLI (The Tucker-Lewis coefficient)	0.982	As close as possible to 1	
NFI (Normed fit index)	0.916	$0.95 \leq NFI \leq 1.00$	$0.90 \leq NFI \leq 0.95$
RMSEA (Root mean square error of approximation)	0.071	$0 \leq RMSEA \leq 0.05$	$0.05 \leq RMSEA \leq 0.10$

Table VI. Results for the structural model

Dependent variable	Independent variable	Estimator	Standard estimator	Significance	R^2 fitted
Youth employability	Youth Computer Skills	0.529	0.632	***	0.399

Note: ***$p < 0.001$

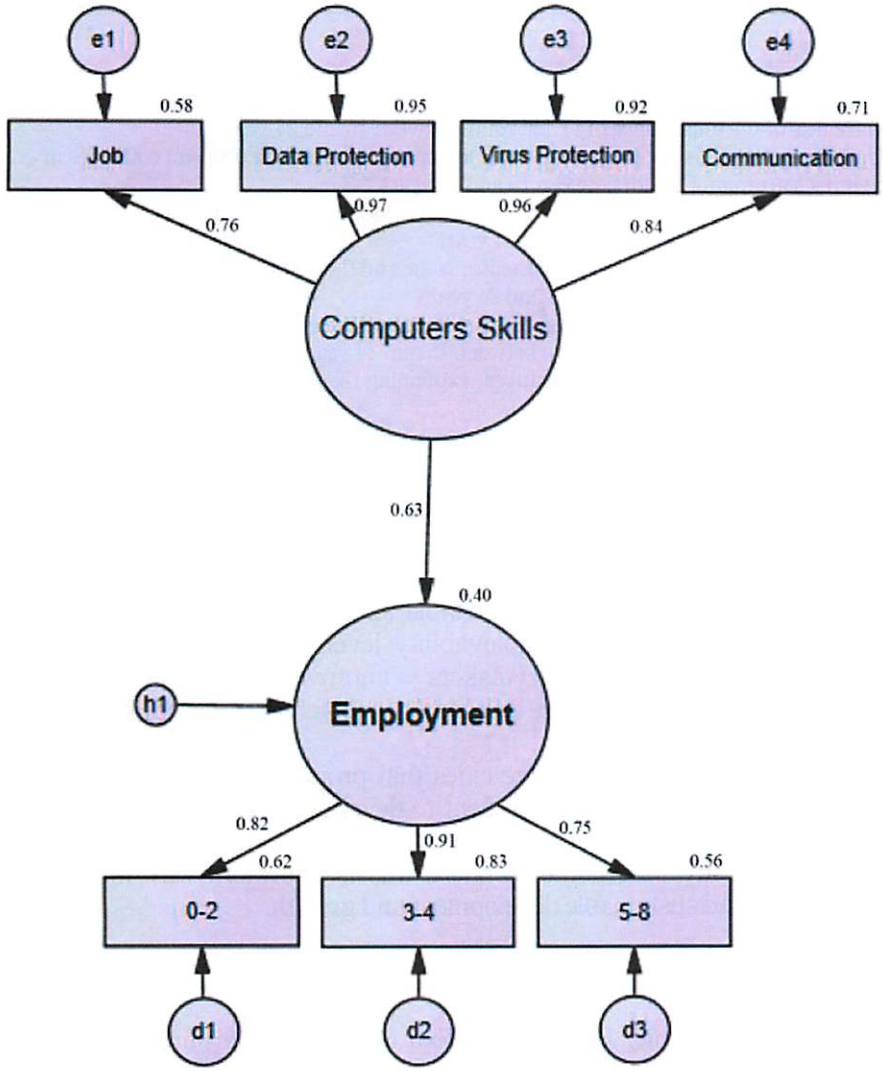


Figure 4.
Results

training courses and adult education centers, on own initiative", that is to say, that for the same level of knowledge, they are attending more courses by their own initiative. The means are 6.526 and 3.444, respectively, which indicate that youth in the Eurozone are more aware on the necessity of training, as they are demanding these training courses on their own initiative.

The answer to *RQ1*, taking into account the tested hypotheses, is shown in Table VII. The results indicate that there is an essential difference between the Eurozone and the other EU countries (tested on *H1.5*).

We conclude that five of the six tested hypotheses are rejected; that is to say, *H1.6*, is the only accepted hypothesis. The one that focuses on awareness of the importance of ICTs skills, and it has been proven in literature (López-Arranz, 2017) to be a key factor for employability in the context of new workplaces arising in the smart cities.

About *RQ2* (*RQ2*), the SEM proved that the computer skills is a relevant factor to explain youth employability in the European Union and that *H2.1* should be rejected.

RQ	Hypotheses	Result
RQ1	*H1.1*: There are differences between the Eurozone and the other European countries in awareness of the importance of IT for youth between 15 and 24 years	Rejected
	H1.2: There are differences between the Eurozone and the other European countries in the ICTs learning for youth between 15 and 24 years	Rejected
	H1.3: There are differences between the Eurozone and the other European countries in internet use for youth between 15 and 24 years	Rejected
	H1.4: There are differences between the Eurozone and the other European countries in computer use for youth between 15 and 24 years	Rejected
	H1.5: There are differences between the Eurozone and the other European countries in IT skills through learning for youth between 15 and 24 years	Accepted
RQ2	*H2.1*: Computer skills is not significant for explaining the employability among youth aged 15-24 in the EU	Rejected

Table VII.
Hypotheses results

To summarize, the main conclusion of this work is that the smart cities can provide some new workplace possibilities for those who are skilled to develop the requirements for these positions. The youth awareness of the importance of IT in general terms, and long-life learning, in particular, will be the most suitable for getting these jobs by means of being more qualified to obtain a higher employability level. Boosting these educational skills among youth is recommended to policymakers to improve youth employment levels and to provide a qualified workforce to those companies involved in the support and promotion of smart cities.

Smart cities are essentially inclusive cities that promote sustainable development in a broad sense. This justified their commitment to developing policies to improve youth ICT skills. These actions not only favor this particular group, but also the labor market as a whole and the economy in general. In short, this is one more way for smart cities to contribute to smart and sustainable development and growth.

Note

1. The Intelligent Community Forum is a global network with a think tank at its center. It connects hundreds of cities and regions on five continents for collaboration on economic development and for exchange of expertise and information that drives progress. Through this network, ICF researches how Intelligent Communities use information and communications technology to build inclusive prosperity, solve social problems and enrich their quality of life in our connected century. (see www.intelligentcommunity.org/what_is_an_intelligent_community)

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PUBLICATION 3

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Sustainable Development, Poverty, and Risk of Exclusion for Young People in the European Union: The Case of NEETs

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Received: 25 October 2018; Accepted: 6 December 2018; Published: 10 December 2018

Abstract: The difficulties of access to the labor market remains in the post-crisis period, particularly for younger people and for those countries more affected by the crisis. The economic conditions with the precariousness of the labor market and higher unemployment taxes for youth, draws a scenario where the risk of poverty and social exclusion could influence young people and discourage them from social and economic participation, and thus the number of young people not in employment, education, or training (NEETs) will increase. The sustainable development in general and the social sustainability in particular needs to solve this important issue to get a balanced and fair social and economic scenario. In this work, the influence of socio economic variables related to the level of prosperity of the country and social protection as well as the risk of poverty and social exclusion on young NEETs is evaluated based on the EUROSTAT data for the year, 2016, for young people. The method was a structural equations model and the results confirm that the key important factors for explaining the situation of the NEETs' are more related to poverty and exclusion than to the economic environment. The main conclusion from these results is the importance of implementing some inclusive actions to prevent an increase in the number of young NEETs, and boosting, in this way, a more balanced and sustainable society.

Keywords: NEETs; youth unemployment; risk of poverty and social exclusion

1. Introduction

Achieving sustainable development worldwide requires an equitable and balanced social and economic environment. The people who are currently looking for their first job are mainly young people known as "millennials". These young people are facing their access to the labor market under very special conditions. On the one hand, the economic situation, which has just emerged from a severe economic crisis; on the other hand, the changing dynamics of the labor market, which requires workers with high levels of training and mastery of information and communication technologies (ICTs). Then, sustainable and balanced development should be understood in the context of a smart growth, which is essential for developing an economy based on knowledge and innovation, and a connected digital single market, which can boost growth in Europe and generate multiple new jobs for younger job seekers together with a lively knowledge-based society [1]. In these circumstances, some young people face barriers that are very difficult to overcome and they become discouraged. This discouragement can affect both the continuation of studies, enrolment in training, and/or in the search for a job. The economic situation of the country and the social support are factors that influence the youth discouragement and, depending on it, young people could become part of the group known as

NEETs (neither in employment nor in education and training). The negative consequences of youth unemployment affect not only individuals, but also the whole society [2].

The economic crisis, which began in the financial sector in August 2007 and had its transformation into the global economic crisis with the stock market crash of September 2008, caused by the fall of the Lehman Brothers, highlighted the weaknesses of the labor model in certain European countries, particularly those most affected by this crisis, whose intensity was unprecedented since the Great Depression of 1929. Some groups, among them youth, were more vulnerable. Although the evolution of the youth population between 1997 and 2017 has experienced a growth of 139 million people, while the youth workforce was reduced by 34.9 million people. The overall participation rate of the youth workforce has decreased over the past 20 years from 55.0% to 45.7%, and in the Organization for Economic Co-operation and Development (OECD) countries, almost 18% of unemployed youth have been without work for a year or more [3].

At the Luxembourg Summit (1997), the European Employment Strategy was adopted. Its main objective was to achieve progress over a five-year period, especially with regard to youth unemployment [4], and this issue continues to be the main concern, as is reflected in the importance given to it in the European Agenda 2030. Moreover, if the amount of NEETs is high, as Quintano, Mazzocchi, and Rocca (2008) [5] stated for the case of Italy, it could represent a social alarm because it could become an obstacle to economic growth, hampering productivity and competitiveness for the whole country, especially when this condition persists for a prolonged period [4]. The rate for young people neither in employment nor in education or training (NEETs) is closely linked to economic performance and the business cycle, but also related to labor policies and social protection. The NEETs rates in the EU-28 in 2016 were 6.1% for people aged 15–19, 16.7% for those aged 20–24, and 18.8% for those aged 25–29. Figure 1 reflects the importance and evolution of the percentages of NEETs. It is shown that there is a great difference attending age groups, and that for the youth from 25 to 29, this is an essential issue, since for 2013 and 2014, the incidence was 21.6% and 21.2%, respectively.

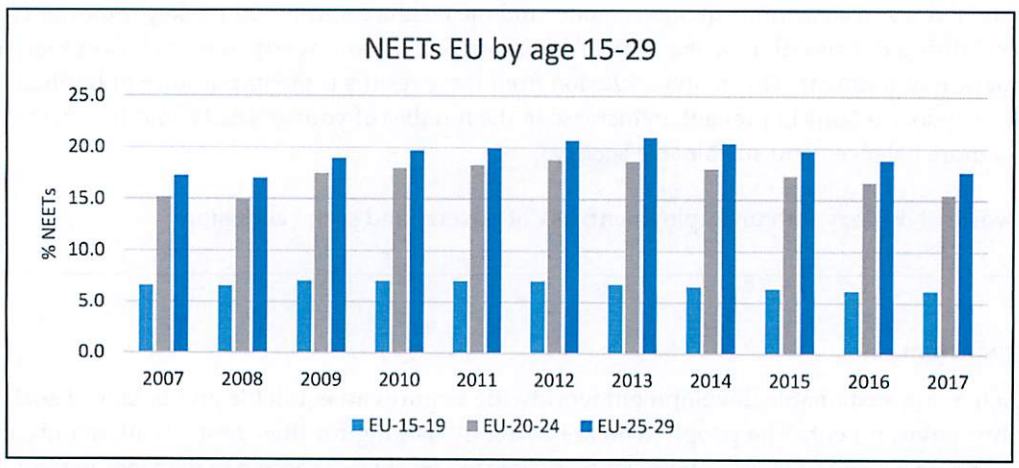

Figure 1. NEETs in the European Union. Own elaboration from Statistical Office of the European Communities (EUROSTAT) data [yth_empl_160].

The economic crisis intensified young people's situation, increasing social inequalities [5], since in the economic context crisis, there is a risk of the emergence of 'the precariat' as a new social class, which involves all those without work or precarious jobs, sometimes highly qualified individuals, who are affected by the environment, which has not allowed them to develop their career as they would have liked [6,7]. The unemployment taxes among youth (15–24 years) have risen quickly, as is shown in Figure 2. The high unemployment levels for youth are one important factor to explain the risk of exclusion and why it is higher for youth than for the whole population. Considering all these circumstances, there is an important risk of exclusion for youth, but is seems to be higher for the

NEETs, as is proved by the data related to the EU, as is shown in Figure 3, and an overview of the total population by age in Figure 4.

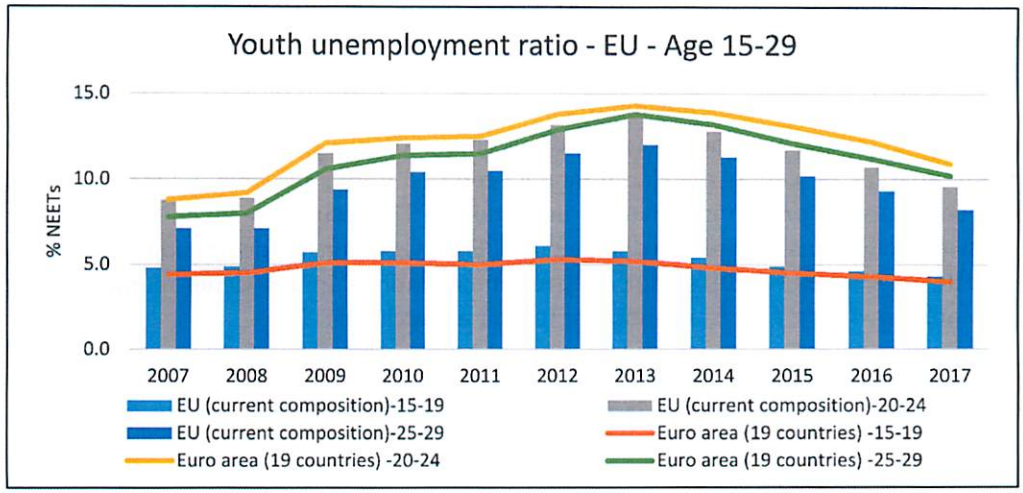

Figure 2. Youth unemployment in the European Union. Own elaboration from EUROSTAT data [yth_empl_140].

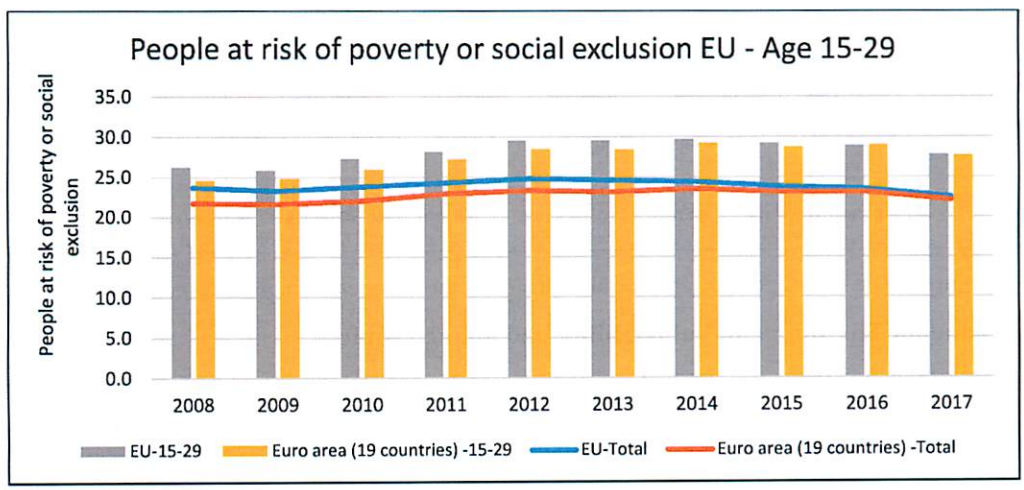

Figure 3. People at risk of exclusion. Own elaboration from data of EUROSTAT [ilc_peps01].

Academic literature points to the economic situation [8,9] and the risk of exclusion [5,10] as important factors interacting [11,12] to influence the youth's discouragement and the possible increase of the number of NEETs. Trying to locate the link among these three variables, in general, and trying to identify a causal relation is the main objective of this work. There is a growing body of academic research on sustainable development and the risk of exclusion for young people, focusing on a wide range of factors of exclusion and its multiple factors, from health and education to labor market access [13–15].

The interest of our research and its main contribution to the literature relies on two main points: On the one hand, establishing and quantifying a causal relation between the number of NEETs and the economic environmental conditions as well as their risk of poverty and social exclusion; on the other hand, to prove that the significant variable to explain the number of NEETs is the risk of poverty and social exclusion, whilst the economic factors become less relevant (data of European Union Statistics Office-EUROSTAT have been used).

The main goal of this paper is to analyze the influence of the socioeconomic environment and the risk of vulnerability as explanatory variables for the incidence of the NEETs phenomenon in the context of the European Union, through a quantitative analysis, which uses the data provided by the statistical office of the European Union. (EUROSTAT) for the year, 2016.

The structure of this paper is as follows: After the statement of the importance of the analyzed issue, as well as its contextualization, shown in Section 1, the influences of the economic environment and the risk of vulnerability as meaningful variables for the explanation of the youth inclusion on the labor market and to avoid their risk of becoming a NEET and the interrelation among the explained variables as well as the causal model proposed in this research are stated in Section 2. The methodological approach is explained in Section 3. The results are given in Section 4, and a discussion and reflections are presented in Section 5. Finally, Section 6 is dedicated to the presentation of the conclusions, together with some policy recommendations. In this section, some limitations of this study are shown as well as some lines for further research.

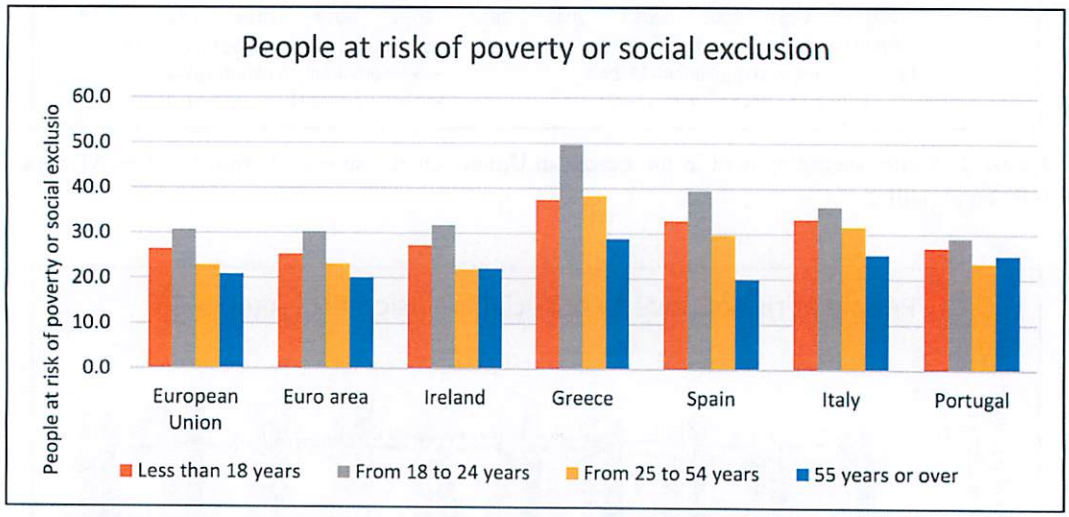

Figure 4. The risk of poverty and social exclusion in the European Union in 2016. [ilc_peps01].

2. The Economic Environment, Vulnerability, and Young People

The special situation experienced by young people currently seeking their first job, due to the economic crisis, has also been influenced by the dominant public policies at that time. In particular, social, labor, educational, and health policies are very relevant because they present a specific environment, which could lead to a situation of labor vulnerability. This occurs both in the case of those who find employment, because it is a job of poor quality, and in the case that they do not find it, because they could fall into discouragement. In this sense, the academic literature points out that the incidence of the number of NEETs is related to the socio-economic environment [5,7] and also with the situation of social vulnerability [16–18], mainly represented through the risk of poverty and social exclusion. Hence, the importance of analyzing the vulnerability of young people in their access to the labor market, considering the socio-economic environment in which they have developed, is identified. It is a complex situation in which the risk of poverty, social exclusion, and involvement in society are present [19]. It has been proven that inclusion avoids discouragement and the possibility of becoming a NEET; Robles, Funes Rivas, and Robles [11] proved both theoretically and empirically that engagement with society can potentially reduce the precarious economic situation, as well as a lack of education and relation being a way to drive young inactive people to be an integrated, active, and included citizen.

Additionally, it is worth highlighting that this problem goes beyond a specific group to become a social problem that has an important projection in the future [2], since the probability of finding a permanent job for those young people who previously were in the NEET position is lower and they

assume a higher risk of precarious employment and other social issues, which even could come to a lack of trust in social institutions [18]. In all the countries of the European Union, the NEETs register high unemployment rates, and many of them, when finishing the basic or compulsory education, do not continue studying either. This inactivity leads to a delay in emancipation, family dependence, lack of integration in society, and can lead to psychological problems, with the ultimate effect of a process of social exclusion [18]. It is like a wound that will heal, but, perhaps, accompany them throughout life. In sociology it is called the "scar effect", which points to the fact that we have generations ahead that will be distrustful and without great motivation neither for the work world nor for other issues. By not having many expectations, they survive reality in the way that they believe that the least harm can be done to them. For those who have had a previous job, this scar effect could be reduced if they have received an unemployment benefit [20], but this does not happen if they are looking for their first job, as it is, in general, the case that concerns this research.

The NEETs Distribution

The economic and social situation of many countries has been so much affected that a decade later they have barely managed to recover the levels of wellbeing prior to the economic crisis. This situation has particularly hurt the countries of the south of the European Union, belonging to the Euro area, which have not been able to use the mechanisms of monetary policy to deal with the crisis situation. This is the case of Greece, Portugal, Spain, and Italy [5,16,21]. The evolution of the incidence of NEETs (provided in Figure 5) seems to remain equal across time and it appears with a quite similar patron both for the whole EU and for the Euro area. The unequal sectorial result of the dynamics of labor supply and demand became imbalanced in the labor market and has worsened in recent decades. The significant presence of very intensive sectors in unskilled work (construction or tourism) explain the high volatility of employment, as was seen in some southern European countries, for example, in Spain [16,22]. However, this situation in the labor market was similar to what happened in other areas of the economy. Specifically, the general environment, due to the policies adopted in those countries to deal with the economic situation, which have been accompanied by restrictions on public spending on fundamental aspects, such as health [23] and education [24]. As a result, some social groups, like today's youth, who were in their childhood or adolescence at the time of application of these policies and, therefore, have been affected by them, are at risk of being part of the NEETs group. It is important to try to avoid this risk, since the NEETs "are exposed to a high risk of poverty and social exclusion, as they cannot improve their skills and competences, losing competitiveness" [5].

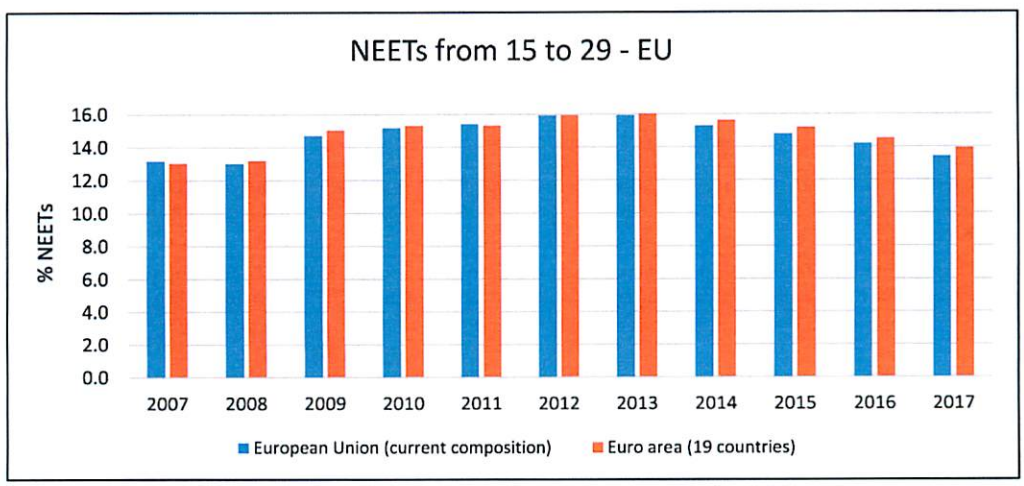

Figure 5. NEETs in the European Union. Own elaboration from EUROSTAT data [yth_empl_160].

The main previous research on causes for becoming a NEET are then linked to the economic threat of vulnerability [11,12]. For the proposal of this paper, the economic environment is understood not

only from wealth, income, or production, but from a perspective of the population participation on the wealth of their country. Regarding the threat of vulnerability, the risks of poverty or social exclusion is a good indicator. According EUROSTAT, people at risk of poverty or social exclusion (AROPE), refers to persons who are either at risk of poverty, or are severely materially deprived or living in a household with a very low work intensity (those persons are only counted once even if they are present in several sub-indicators). The AROPE rate, the share of the total population which is at risk of poverty or social exclusion, is the headline indicator to monitor the EU 2020 Strategy poverty target.

The risk of poverty and exclusion in the European Union is higher the younger the population is, as can be seen in Figures 4 and 6, where the EU, Euro area, and the countries more affected by the economic crisis, are shown for the people at risk of poverty or social exclusion and the NEETs, respectively.

Detailed data for every single country as well as the evolution of the last years can be seen in Table 1. There are substantial differences among countries. Nevertheless, complex and different factors seem to be the explanatory reasons for these disparities. One of the possible reasons, related to economic issues and the economic crisis, could rely on belonging (or not) to the Euro Area because those countries involved in the unique coin have lost the monetary policy as a very powerful instrument to face the crisis. This point is taken into account in this work and it is analyzed.

Table 1. % of NEETs in countries of the EU.

GEO/TIME	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belgium	12	12.8	13	13.8	14.4	14.9	14.1	14.4	13	12.6
Bulgaria	18.5	20.8	23.5	24.7	24.7	25.7	24	22.2	22.4	18.9
Czechia	10.7	12.7	12.9	12.1	12.9	12.8	12.1	11.8	11.1	10
Denmark	5	6.5	7.3	7.6	8.2	7.5	7.3	7.7	7.4	9.1
Germany	11	11.4	10.8	9.7	9.3	8.7	8.7	8.5	8.9	8.5
Estonia	11.4	18.3	18.1	14.7	15.1	14.3	13.8	12.5	13.8	11
Ireland	15.5	20.2	21.7	22.4	21.6	18.8	18	16.7	14.7	12.9
Greece	14.8	15.9	18.6	23	26.8	28.5	26.7	24.1	22.2	21.3
Spain	15.3	19.9	20	20.6	22.2	22.5	20.7	19.4	18.1	16.4
France	12.6	14.7	14.8	14.7	15.1	13.8	14.1	14.7	14.4	13.9
Croatia	13	14.9	17.6	19.1	19.7	22.3	21.8	19.9	19.5	17.9
Italy	19.3	20.5	22	22.5	23.8	26	26.2	25.7	24.3	24.1
Cyprus	10.9	11.5	12.9	14.8	17.3	20.4	19.5	18.5	18	17.6
Latvia	13.6	20.8	20.7	19.1	17.2	15.6	15.2	13.8	13.3	12.3
Lithuania	11.9	15	17	14.7	13.9	13.7	12.9	11.8	10.7	10.2
Luxembourg	9.2	7.5	6.1	6.6	7.6	7.2	6.5	7.6	6.8	6.6
Hungary	15.9	17.9	17.7	17.6	18.7	18.4	16.4	15.1	14.1	13.3
Malta	11.4	12.6	12.2	12.1	12	10.9	11.6	11.8	9.4	8.8
Netherlands	4.6	5.3	5.7	5.9	6.5	7.5	7.6	6.7	6.3	5.9
Austria	8.9	9.6	9.1	8.5	8.2	8.6	9.3	8.7	8.9	8.4
Poland	12.7	14	14.8	15.2	15.7	16.2	15.5	14.6	13.8	12.9
Portugal	11.9	12.5	13.6	13.9	15.6	16.4	14.6	13.2	12.8	10.6
Romania	13.2	15.7	18.9	19.5	19.3	19.6	19.9	20.9	20.2	17.8
Slovenia	7.5	9.3	9.4	9.4	11.8	12.9	12.9	12.3	10.9	9.3
Slovakia	15.3	17.3	19	18.7	18.8	19	18.2	17.2	15.9	16
Finland	8.9	11.3	10.5	10	10.4	10.9	11.8	12.4	11.7	10.9
Sweden	8	9.9	8.3	7.9	8.4	7.9	7.8	7.4	7.1	6.8
United Kingdom	13.1	14.4	14.6	15.4	15.3	14.6	13.4	12.7	12.3	11.4

Note: Highlighted are those countries belonging to the Euro area; Source: EUROSTAT-Young people neither in employment nor in education and training by sex, age, and labour status (NEET rates) [edat_lfse_20].

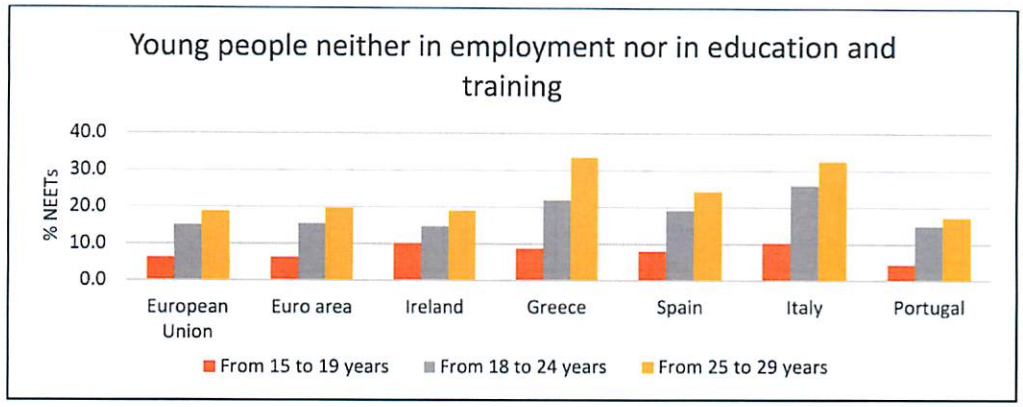

Figure 6. Young people neither in employment nor in education and training in the European Union in 2016. Source: Own elaboration from EUROSTAT data [ilc_peps01].

Considering the described scenario, the research question to solve here is if the economic environment and risk of vulnerability influences the incidence of NEETs' problem in the context of the EU and, if so, the magnitude of this influence. In accordance, the model proposed in this work tries to link the economic framework, on the one hand, the poverty, and social exclusion risk, and, on the other, to explain the amount of NEETs. Then, the dependent variable will be the people at NEETs situation and the impendent ones will be the economic environment and the risk of poverty and exclusion and, by means of this simple model, a casual relation is explored.

As it was shown, according to the literature, it is expected that a causal relation between the situation of the economy and the incidence of the number of NEETs, as well as a direct and positive causal relation between the social situation (in terms of poverty and social exclusion) and the NEETs exists. Then, these relations can be summarized as the specific hypothesis to be tested, which are shown in Table 2. The first hypothesis (H1) is testing if the economic environment is a cause influencing the number of NEETs; if so, according to the literature, the expected sign of this relation should be negative, since the better the economic environment, the lower the NEETs incidence in the EU. The second hypothesis (H2) is testing whether the risk of poverty and social exclusion influences the number of NEETs in the EU. In the case of the existence of this causal relationship, the expected sign is positive, since the higher the risk, the greater the number of NEETs.

Table 2. Main hypothesis.

Hypotheses
H1: Economic environment influences NEETs incidence in the European Union
H2: Poverty and social exclusion influences NEETs incidence in the European Union

Hypotheses to be tested in this work.

The graph representing this model is shown in Figure 7, by means of the output of the AMOS-IBM SPSS software. The big circles represent the latent variables (ξ in Equation (1)), the squared/rectangles are the observable variables. The circles with the "e_i" (δ in Equation (1)) names are the measurement errors (related to the measurement model and the construction of the latent variables) and the circle with the "z1" is the estimation error (related to the structural model and the regression analysis).

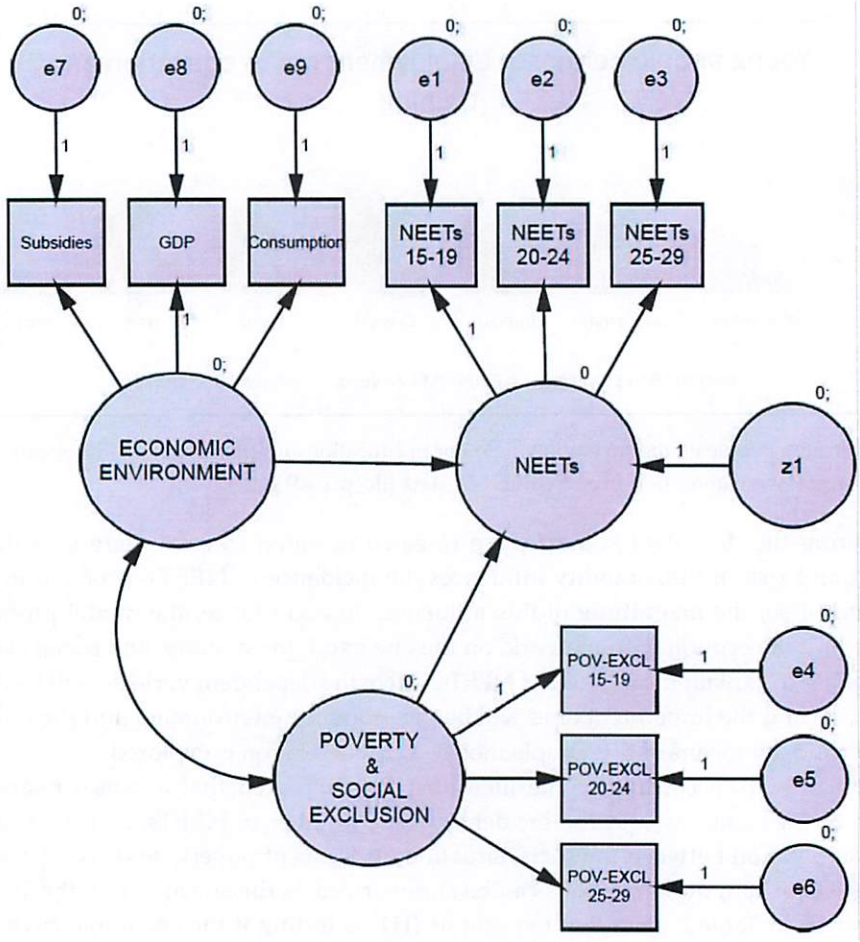

Figure 7. The variables in the model.

In addition to this analysis, possible differences between countries should be explored to demonstrate the validity of the approach focused on the study of the European Union as a whole as well as to strengthen the proposed model, in the case no differences have been found.

3. Method

The methodologic approach used is a quantitative analysis based on structural equation modelling (SEM). It is worth highlighting the potential of the proposed methodology for the study of causal relationships between unobservable variables. This method applies jointly to the techniques of factor analysis and linear regression. SEM has been useful to address many substantive problems in society, which are based on the "path analysis" proposed by Wright [25,26] and later developed by Jöreskog [27,28] and for Jöreskog y Sörbom [29]. SEM models analyze the causality between one or several variables (independent/or dependent) by considering the existence of multiple interrelationships between them, with the possibility of working simultaneously with observed and latent variables, as well as stablishing causal relationships. From our point of view, it is an adequate method since the main objective is to establish a causal relationship.

It is worth highlighting the potential of the proposed methodology for the study of causal relationships between unobservable variables. The aim is to jointly apply the techniques of factor analysis and linear regression, in the context of a specific theoretical frame of reference. Thus, it is intended to compare the behavior of a real situation with the expected (through the comparative analysis of the variance-covariance matrix of the model to be tested with the theoretical proposal). The confirmatory factor analysis allows the "creation" or "construction" of those variables that cannot

be directly observed, mainly due to the multiplicity of factors that make them up (which are known as observable and quantifiable). All these observable variables together, as a set, constitutes the so-called "latent variable or construct".

The constructs are evaluated according to the so-called "measurement model", which analyzes their internal consistency and reliability. In addition, the "structural model" studies the causal analysis, which allows testing hypotheses of causality, according to an expected theoretical model. The advantages of structural equations are manifested mainly in determining the reliability of the latent variable and its relation to each of the indicators that make it up, and, on the other hand, allows us to test and quantify the expected dependence causal relationships, according to a model of linear regression, in which dependent and independent variables can be observable or latent.

In this study, we have three latent variables: The economic environment and the risk of poverty and social exclusion (as independent or explanatory variables) and the incidence of NEETs phenomenon (as the dependent or explained variable).

3.1. The Measurement Model

The observable variables' data were collected from the EUROSTAT database, specifically from income and living conditions (ilc) and annual national accounts (nama10) statistics for the structural model and from other EUROSTAT sources, such as [yth_empl_160], [yth_empl_140], [ilc_peps01], [edat_lfse_20], and [nama_10_gdp]. The latent variables construction aimed to integrate all the relevant information about each of them. The NEETs variable (ξ_2) assembles all information about the percentage of NEETs in the European Union who are unemployed. To collect the range of the different indicators, the main three age groups were considered: From 15 to 19 years, from 20 to 24 years, and from 25 to 29 years (see Table 3); in this way, the difference incidence of NEETs according to the age groups (see Figure 4) was considered. It is interesting to point out that the range of age for NEETs is variable for different organizations and countries, for example, the United Kingdom references to people between 16 and 26 years; and in Japan, it is from 15 to 34 years. The European Union considers youth to be those aged between 15–24 years, but for analyzing NEETs, EUROSTAT provide data for those aged from 15 to 29 years. In this paper, we take all these range of age [15–29], due to the relevance for the last stretch of ages.

Table 3. Latent variables and indicators.

Latent Variable	Indicator	Content
Economic Environment	Subsidies	Subsidies. Current prices, million euro. Data from EUROSTAT: GDP and main components (output, expenditure, and income) [nama_10_gdp].
	Gross Domestic Product (GDP)	Gross domestic product at market prices. Current prices, million euro. Datafrom EUROSTAT: GDP and main components (output, expenditure, and income) [nama_10_gdp].
	Final Consumption	Final consumption expenditure at current prices, million euro. Data from EUROSTAT: GDP and main components (output, expenditure, and income) [nama_10_gdp]
Poverty and Social Exclusion	Risk of Poverty and Social Exclusion of people from 15 to 19 years	% of people at risk of poverty or social exclusion (from 15 to 19 years). Data from EUROSTAT: People at risk of poverty or social exclusion by age and sex [ilc_peps01]
	Risk of Poverty and Social Exclusion of people from 20 to 24 years	% of people at risk of poverty or social exclusion (from 20 to 24 years). Data from EUROSTAT: People at risk of poverty or social exclusion by age and sex [ilc_peps01]
	Risk of Poverty and Social Exclusion of people from 25 to 29 years	% of people at risk of poverty or social exclusion (from 25 to 29 years). Data from EUROSTAT: People at risk of poverty or social exclusion by age and sex [ilc_peps01]
NEETs	NEETs from 15 to 19 years	% of people at risk of poverty or social exclusion. Not employed persons. Neither formal nor non-formal education nor training. All ISCED 2011 levels (from 15 to 19 years). Data from EUROSTAT: Young people neither in employment nor in education and training by sex, age, and educational attainment level (NEET rates) [yth_empl_160]

Table 3. *Cont.*

Latent Variable	Indicator	Content
	NEETs from 20 to 24 years	% of people at risk of poverty or social exclusion. Not employed persons. Neither formal nor non-formal education nor training. All ISCED 2011 levels (from 20 to 24 years). Data from EUROSTAT: Young people neither in employment nor in education and training by sex, age, and educational attainment level (NEET rates) [yth_empl_160]
	NEETs from 25 to 29 years	% of people at risk of poverty or social exclusion. Not employed persons. Neither formal nor non-formal education nor training. All ISCED 2011 levels (from 25 to 29 years). Data from EUROSTAT: Young people neither in employment nor in education and training by sex, age, and educational attainment level (NEET rates) [yth_empl_160]

Latent variables and indicators are the observable values related to the constructs.

The economic environment latent variable (ξ_1) was constructed with the aim of collecting information about different spheres of the economy: One related to the general economic position of the country, the other to consumers' purchasing capability and another about the public policies that exist to support citizens. So, three indicators or observable variables were selected: One related to the global welfare situation of the country ("gross domestic product"—GDP-measured at market prices, current prices, million euro), another as an indicator of the expenses of the people (the "final consumption expenditure" at current prices, million euro), and another related to the policies supporting citizenship ("subsidies". Current prices, million euro).

Regarding the construct of poverty and social exclusion (ξ_3), it compiles the information by age sectors, with the aim of catching all possible dissimilarities of prevalence due to the age groups. So, the indicators are: Percentage of people at risk of poverty or social exclusion (from 15 to 19 years), percentage of people at risk of poverty or social exclusion (from 20 to 24 years), and percentage of people at risk of poverty or social exclusion (from 25 to 29 years).

The measurement model explains the relation between the latent and observable variables, which is reflected in Equation (1):

$$X = \Lambda\, \xi + \delta \quad (1)$$

3.2. The Structural Model

This causal relation can be identified by linear regression modelling, which is established between the two independent variables (the economic environment and the risk of poverty and social exclusion) and the dependent one: The incidence of NEETs, measured as a percentage of people in that range of age (being NEETs from "i" to "j" years as the percentage of people from "i" to "j" years who are neither in employment nor in education and training). The different incidences of the phenomenon of NEET for the different groups of ages suggest that a latent variable should be created that is constructed with the information of these groups. So, the data of the percentage of NEETs for each age groups are the observed variables, whilst all together they construct the variable NEETs of the proposed model, with the advantage of catching all the information in one single variable (see Table 3).

The causal relationships are reflected with structural equations, that is, with regression equations in the context of a causal model (structural equation), where the coefficients are known as structural parameters [30]. On the other hand, all these variables are not a simple measure of a single item. In fact, they are constructed by some different indicators. The measurement model contained in this methodology determined these variables based on the adequate indicators. The indicators for the unobservable variable are shown in Table 3.

The economic environment has been approached by means of the subsidies as the indicator for the social protection expansion in the country; the gross domestic product at market prices, defined as the final result of the production activity of resident producer units, as the measurement of economic activity; and the final consumption as an indicator of prosperity or spending capacity.

The poverty and social exclusion and the NEETs' latent variables were constructed by considering the different age groups, since the incidence and behavior is quite different depending on age [5,31,32]. In fact, it has been proved that the NEET phenomenon involves mainly older age classes [5,32].

On the other hand, the possible differences among countries were also analyzed. Since the last economic crisis had such different impacts on the countries belonging to the Euro area (particularly those on the south of Europe), it could be expected that a dissimilar impact on youth discouragement and their educational and labor engagement as well as in their interest in joining the labor market and/or training or education differed also. For this reason, a *t*-test for a means' comparison analysis was undertaken. Two groups of countries were considered: Those belonging to the Euro area and the other European Union Members (with current composition). The main reason for studying these two blocks of countries is the possibility (or not) of using the monetary policy to face the crisis effects, because, for the countries immerse in the Euro Area, this possibility does not exist, since it is only on the hands of the European Central Bank. On the contrary, the other European countries are free to modify their exchange rate and it is a really important tool, which could make a strong difference in the economic environment and in the public policies designed in this context.

4. Results

The reliability and internal consistency of the measurement model was tested by means of the, Cronbach's alpha [33], rates of composite reliability [34], and variance extracted values [35]. The results are shown in Table 4.

It is accepted that alpha should be higher than 0.7 [36,37], and composite reliability (CR) should produce scores at least equal to 0.5 [38] to confirm the internal consistency of constructs; another ratio to test the of the latent variable's strength is the average variance extracted (AVE), which should achieve values over 0.5 [37]. All the variables in the model were within these values. All indicators were significant (p-value < 0.05). The fit of the model was tested by means of the comparative fit index (CFI) [30], and the minimum discrepancy rate (CMIN/DF = χ^2/df = Chi-Squared/degrees of freedom) [39], whose values are 0.932 and 0.171, respectively, and are within the suggested values for an acceptable fit.

Table 4. Results for the measurement model.

Latent Variable	Observable Variable	Squared Multiple Correlations (λ^2)	Alpha Cronbach
Economic Environment (ξ_1)	Subsidies (x_{11})	0.694	0.750
	Gross Domestic Product (GDP) (x_{21})	0.998	
	Final Consumption (x_{31}).	0.995	
Poverty and Social Exclusion (ξ_2)	Risk of Poverty and Social Exclusion of people from 15 to 19 years (x_{12}).	0.790	0.795
	Risk of Poverty and Social Exclusion of people from 20 to 24 years (x_{22})	0.324	
	Risk of Poverty and Social Exclusion of people from 25 to 29 years (x_{32})	0.340	
NEETs (η)	NEETs from 15 to 19 years (y_1)	0.515	0.881
	NEETs from 20 to 24 years (y_2)	0.932	
	NEETs from 25 to 29 years (y_3).	0.876	

Main indicators for testing the accuracy of the measurement model.

The equations for the measurement model are:

$$x_{11} = 0.83\ \xi_1, \tag{2}$$

$$x_{21} = 0.99\ \xi_1, \tag{3}$$

$$x_{31} = 0.99\,\xi_1, \quad (4)$$

$$x_{12} = 0.89\,\xi_2, \quad (5)$$

$$x_{22} = 0.57\,\xi_2, \quad (6)$$

$$x_{33} = 0.58\,\xi_2, \quad (7)$$

$$x_{13} = 0.72\,\xi_3, \quad (8)$$

$$\eta = \beta_1\xi_1 + \beta_2\xi_2, \quad (9)$$

$$x_{33} = 0.94\,\xi_3, \quad (10)$$

The structural model results are summarized in Table 5, where the casual relations are assessed.

Table 5. Results for the structural model.

Dependent Variable	Independent Variable	Standardized Estimator	S.E.	C.R.	P	R^2 (Fitted)
NEETs (η)	Economic Environment (ξ_1)	0.104	1.711	0.728	0.466	0.657
	Poverty and Social Exclusion (ξ_2)	0.816	0.234	3.181	0.001	

Taking into account the results of the structural model, it is shown that the risk of poverty and social exclusion is an explanatory variable of the incidence of NEETs among young people in the European Union, while economic factors are not significant.

$$\eta = \beta_1\xi_1 + \beta_2\xi_2, \quad (11)$$

$$\eta = 0.104\,\xi_1 + 0.816\,\xi_2, \quad (12)$$

In Equation (11 the structural model is described, and in Equation (12), there are the specific values of standardized estimators for this model.

The fitted R-squared was 0.657, what means that the model can explain more than 65% of the variability of the NEETs.

The analysis for identifying differences among countries was conducted to search for some evidence on this issue. A *t*-test for mean differences for independent samples was applied (with the SPSS IBM Statistics Program, 20th version). The results indicated that there were no differences for the whole number of NEETs for the consideration of the different age groups. Similarly, the results do not indicate statistically significant differences in the risk of poverty and social exclusion of young people as a whole, neither in data disaggregated by age groups.

5. Discussion

The results of this analysis indicate that the measurement model was adequate because the values for the indicators shown in Section 4 were in accordance with the standards. Therefore, the latent variables considered here are well constructed and accurately reflect the construction of the latent or unobservable variable.

Once the unobservable variables were identified, the causal relationships among them were analyzed by conducting a linear regression analysis. The results indicate that one of the independent variables was not statistically significant in explaining the dependent one: The economic environment, *p*-value = 0.466), so H1 was not supported by this model. On the contrary, H2 was supported, because the variable risk of poverty and exclusion was statistically significant (*p*-value = 0.001).

By means of structural equation modelling, it was identified that the main determining factor for young people to become part of the NEET group is the vulnerability or risk of poverty and social exclusion. These results are consistent with many of those obtained by previous

research [5,11,17,19,40], because the risk of social inclusion is shown as a key point for avoiding discouragement and being more involved in society, and, consequently, avoiding being a NEET.

The distribution of the NEETs in the different countries in the European Union was analyzed in this work, however, due to this not being the key issue here, an overview is provided. Considering the descriptive statistics from data provided in Table 1, it is clear that deeper analysis is required. The focus on the differences among countries due to belonging to the Euro area showed no statistical significance differences, which indicates that the economic environment (in terms of economic policies available) are not key to explaining the incidence of the NEETs number. On the other hand, if there are no differences for the number of NEETs in the member states due to their economic status (monetary policy), the results obtained by the structural model remain consistent and reinforced.

6. Conclusions

The structural model shows that there was a causal relationship between the analyzed variables. The independent variables explained the incidence of the risk of becoming a NEET; nevertheless, the causal relationship with the specific variable poverty or social exclusion was definite, however, the aspects related to the economic environment show weaknesses in explaining the condition of NEETs, as it was not statistically significant. Thus, in relation to the hypotheses raised, we must confirm the second, but reject the first, which remarks on the importance of avoiding the risk of exclusion and poverty in any country and economic environment to dissuade discouraged youth from becoming a NEET. The response to the research question about the influence of the economic environment and risk of vulnerability on the incidence of NEETs problem in the context of the EU and its magnitude was partially affirmative, but identifies the different incidence of both dependent variables, since the one related to social issues is essential, whilst the economic issues has a subordinate importance.

These results, underlining the importance of social environment for NEETs in the context of the European Union, are in accordance with the ones shown by previous researches [5,17,19,40] in several different frameworks.

The main conclusions point out to the reinforcement of social protection as a key factor for the avoidance of youth becoming discouraged, thus diminishing their probability of becoming a NEET. This social protection measure should be understood in a wide sense, that is to say, covering a wide range of public policies, both economic and social, including health and education [41], which are fundamental for youth development without inequalities [13]. In summary, some measures driven to boost social cohesion and social sustainability could help to avoid an increase of NEETs. Our results are in concordance with the literature [11,12], and goes one step ahead by proving that the risk of exclusion and poverty is more relevant for becoming a NEET than an adverse economic environment. The strength and relevance of the results achieved in this work relay mainly on demonstrating this point by means of the SEM's model, which concluded that by avoiding the risk of poverty and exclusion of youth, the percentage of NEETs in the EU will probably result in a decrease of NEETs. Nevertheless, some limitations should be pointed out. On the one hand the cross-sectional nature of this analysis needs to be completed from a dynamic perspective, and, on the other hand, the study of the main reasons for explaining differences among countries should be undertaken, from the point of view for each single country, since the analysis presented here only justified that there are no differences for belonging or not to the Euro area.

Future research should analyze the dynamics of this issue, focusing on a wider range of years, as well as on some specific policies' influence on youth concerns to promote their engagement in society and to create a more inclusive and equitable society, compatible with whole sustainable development. On the other hand, extending research regarding the differences among countries and the influence of their specific social policies for including the NEETs is also needed.

Author Contributions: Conceptualization, S.M.R.-B., F.G.-L. and X.P.; methodology, X.P.; software, S.M.R.-B., F.G.-L. and X.P.; validation, S.M.R.-B., F.G.-L. and X.P.; formal analysis, S.M.R.-B., F.G.-L.; investigation, S.M.R.-B., F.G.-L. and X.P.; resources, S.M.R.-B., F.G.-L.; data curation, X.P.; Writing—original draft preparation, X.P.; Writing—review and editing, S.M.R.-B., F.G.-L. and X.P.; visualization, S.M.R.-B., F.G.-L. and X.P.; supervision, S.M.R.-B. and F.G.-L.; project administration, n/a.; funding acquisition, n/a.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

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PUBLICATION 4

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WELLBEING AT WORK: SELF PERCEPTION OF WORKERS FROM A GENDER PERSPECTIVE

Abstract. *Perceived wellbeing at the workplace could be related to various factors such as the training received, the general working environment and particularly, the level of gender equality. Moreover is expected that the higher wellbeing at work will be reflected in a higher general welfare. This paper discusses the sense of wellbeing at the workplace, and general welfare, regarding the training and perceived gender equality for those employed in the Spanish System of Ports. To carry out the work, we have relied on the European Survey on Working Conditions, through the adaptation of that questionnaire. Through a structural equation model (SEM) analysis, and a mean comparison analysis, it was found that the women's perceptions on all studied variables are lower than the men's ones. We found a causal relationship between perceived gender equality, training courses and wellbeing at work, as well as between this last variable and general welfare.*

Keywords: *working conditions, gender equality, perceived equality, structural equations model (SEM)*

JEL Classification: J28, J16

1. Introduction

Achieving social and individual well-being is one of the main goals of individuals and governments. Most people get income that allow them to survive, through their work. Thus, social relations and labor relations are closely linked and societies are structured around the labor market. However, access to that market does not have the same difficulty for men than for women, and society and governments are aware of this situation(Estévez-Abe, Iversenand Soskice, 2001).

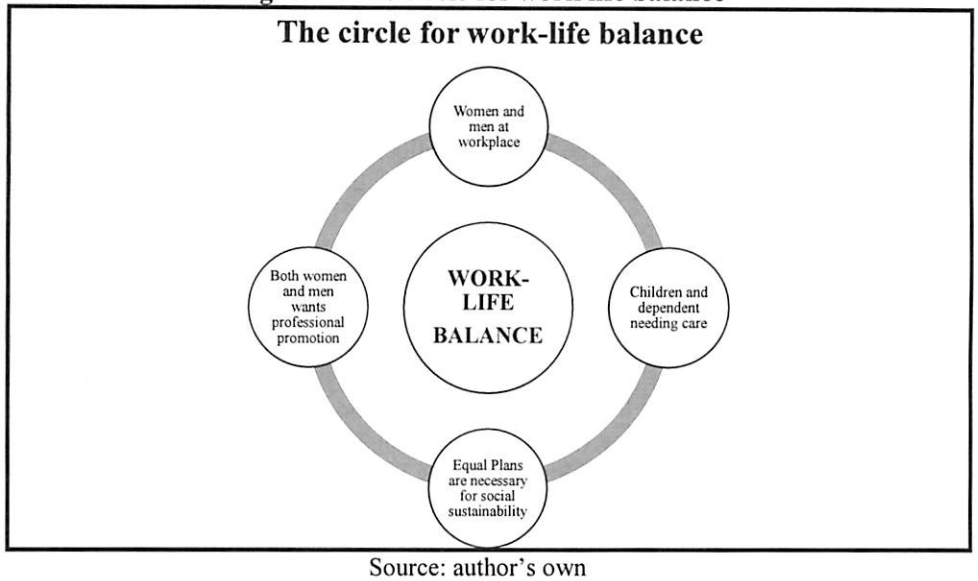
Once somebody has got a job, they must keep it and perform their tasks in the best way possible, so they must attend training courses, if they seeks to improve for getting a better job or getting a better position in the same firm(Tam, 1997)have analyzed how increasing training has increased the women at high paying occupations, and they stated that "in terms of occupational structure, a higher percentage of women were employed in high-paying occupations, mainly due to improvements in their educational attainment".

This is emphasized in the more specialized positions(Iversen and Rosenbluth, 2012), and, in occasions, women feel themselves excluded of some kind of jobs(Polachek, 1981). Moreover, the organizational structure of the workplace, has been identified as a potential proponent of work–life balance for the employee (Mazerolle and Goodman, 2013). Moreover, related to the expectations of those attending the courses (Tella, Ayeni andPopoola, 2007), the workers are willing to do and effor in the expectance of better conditions, improved salary or other material issue.In this context, women find themselves in situations of weakness, mainly because of their family responsibilities. Fursman and Nita (2009) (2009) have proved that for some people, accepting paid employment to fit in with their caring responsibilities resulted in significant under-employment, or under-utilisation of skills. Indeed, although it is proven that women have reached high levels academic training (even higher than men), they found difficulties in accessing management positions and also to promote themselves at work (the "glass ceiling").In trying to prevent such situations, governments have enacted legislation to promote equality between the sexes. Specifically, in the working environment they have been launched called "Equality Plans".

Terms such as social wellbeing of workers may lead us to think of happiness but, in occasions, this has bad press. To talk of happiness and recognizing it has become cause for suspicion for some, to the point that the recognition of happiness becomes a sign of simplicity, typical of fools. This attitude reflects the fact that for many analysts, feeling happy is equivalent to a state of dereliction of introspection and lucid analysis of reality.

The study of subjective wellbeing refers to the degree to which individuals themselves say they are subjectively satisfied with their lives or some aspects of their lives (family, work) and does not have to be endorsed by the opinion of others (Avia and Valverde, 1999); This research is framed in the context of economic analysis and areas of labor legislation, related to gender equality, from an applied point of view. The focus is on the study of perceived wellbeing in the workplace through the analysis of job satisfaction. This variable will be explained in terms of perceived gender equality in the workplace and the efforts to keep updated through training courses. The main reason for this is that job satisfaction is considered a prerequisite for improving the living conditions of people. Therefore productivity of organizations could be augmented if these living conditions were favorable to increase perceived satisfaction. Figure 1 show the circle for work-life balance.

Figure 1. The circle for work life balance



Source: author's own

1. Wellbeing policies in the workplace in Spain

As is indicated in the VII report on exclusion and social development in Spain, the economic and financial crisis triggered in the European Union has not been an incentive, nor a good opportunity to deepen the commitment to the objectives of the Treaty on European Union and the Charter of Fundamental Rights of the European Union. Nor has it been used to develop policies aimed at creating harmonious, cohesive and inclusive societies, which respect fundamental rights in healthy social market economies, as is stated in the Treaty. The European Parliament criticized, with great harshness, the troika as an emergency mechanism to deal with the debt crisis of the Member States (Picatoste, Ruesga-Benito and González Laxe, 2016; Picatoste, 2014). It also states that the policies of austerity, with cuts in social services and welfare, as well as its deflationary impact on the economy, are incompatible with the objective of poverty reduction in the Europe 2020 Strategy, as well as other EU objectives such as social inclusion, equality, poverty eradication and territorial cohesion. Therefore, we can say that the crisis has imposed a setback and a decline in those economic, social and employment policies of the EU, which had helped to improve working conditions, health, safety, promotion of equal opportunities and social inclusion. This is therefore, the situation that currently prevails in the labour relations of our country to which our workers are subject. Restriction policies have forgotten that wellbeing at work is important, not only for the physical and mental health of the workers who consistently produce financial gains for employers and our social security system by decreasing occupational accidents and absenteeism from work but also above all it is well established that satisfied workers produce far more effectively thereby

obtaining greater benefits for the company.Social policies applied since the end of 2011 with the first labour reform and those promoted by the Royal Decree-Law 20/2012 of 13 July (Spanish Royal Decree-Law 20/2012) on measures to ensure budgetary stability and promoting competitiveness, and currently in effect are resulting in the subordination the state of wellbeing to the demands proposed by the EU. These reforms have led to a significant decline in the social policies of our country.

1.1. The gender equality: the Equality Plans for the firms and the wellbeing at work

The difficulties of women for getting a job and maintaining it are clear (Durbin and Fleetwood, 2010), then, avoiding gender inequality is an important issue in all fields, and particularly in the workplace. This work is based on the European survey of working conditions (EWCS)(European Union. Eurofound, 2012). The European Working Conditions Survey (EWCS) is conducted by the European Foundation for the Improvement of Living and Working Conditions (EFILWC), which is an autonomous agency of the European Union (EU), funded from the general budget of the European Commission (European Foundation for the Improvement of Living and Working Conditions, 2012).Specifically, the factors which have been analyzed include: conflict with personal values, emotions, feelings, work stress and finally, the effort expended in updating workers' training as measured by the courses taken, whether or not financed by the company. On the other hand, gender based equality has been evaluated based on the promotion of balance between the number of men and women in the workplace, perceived equality and facilities for work conciliation. The study has been applied to the situation of workers employed in the Spanish ports of general interest.

Thus, the idea is to explain perceived wellbeing in the workplace in terms of continuing training conducted and perceived gender equality. Indeed, the academic training received and level of education attained, as well as training for current work are fundamental aspects to explain the employment status and job satisfaction perceived by workers. The main reason is based on the expectations generated, because everyone is hoping for an increase in status and prosperity within the structure of the business organization. The highest sensation of wellbeing is achieved via a higher level of education and work accomplished. It has been seen how the factors that most influence each person's subjective wellbeing is based not only on their own situations, but also in relationships with other people (couples, friends and co-workers), social participation, and the social environment (equality, civil liberties, respect for human rights, etc.). It is important to note that a focus on theories about wellbeing and happiness makes a significant contribution to projects in other businesses, such as law, economics or industrial associations, and they are closely related to the worker as a human, whose feelings are a key issue (Worchel, et al, 2003).The human being is intrinsically a social being. Data from studies can

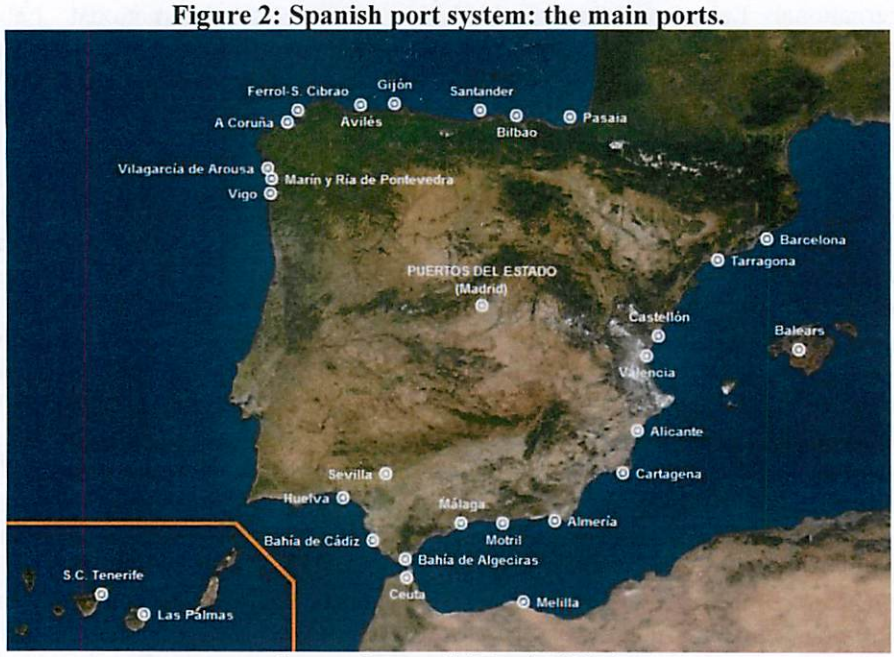
be seen that although the amount of money you earn has little to do with happiness, how satisfied you are with your income is, and satisfaction does not always correspond with higher incomes (Diener and Fujita, 1995). In 1999, the International Labor Organization (ILO) (International Labor Organization, 1999) created the concept of decent work as a way to identify the priorities of the Organization and to recognize that work is a source of personal dignity, family stability, peace in the community, democracies acting in benefit of all, and economic growth, which increases the opportunities for productive work and business development (Report of the director General to the 87th Meeting of the International Labor Conference held in 1999). The International Labor Organization unanimously adopted the ILO Declaration on Social Justice for a Fair Globalization on June 10, 2008 (adopted by the International Labor Conference at its Ninety-seventh Session, Geneva, June 10, 2008)(Rodgers et al, 2009). This statement comes at a crucial political moment, reflecting the wide consensus on the need for a strong social dimension to globalization which permits achieving improved results and that these results are distributed in a more equitable manner among all. The Declaration constitutes a compass for the promotion of a fair globalization based on Decent Work, as well as a practical tool to accelerate progress in the implementation of the Decent Work Agenda at the country level. It also reflects a productive perspective that emphasizes the importance of sustainable businesses for creating more jobs and income opportunities for all. The Conference recognizes and declares that "in the context of accelerating change, the commitments and efforts of Members and the Organization to implement the ILO's constitutional mandate, including through international labor standards, and to place full and productive employment and decent work at the center of economic and social policies, should be based on the four strategic and equally important objectives of the ILO, through which DWA is reflected and can be summarized in promoting employment by creating a sustainable institutional and economic environment under which people can develop and update skills and competencies they need to work productively occupied for their personal fulfilment and the common good".

1.2. The Spanish port system and their Gender Equality Plan

The main objective of this paper is to analyze the wellbeing of the people who serve as employees in the principal Spanish ports, known as "ports of general interest" (a total of 28 Port Authorities), all dependent upon an autonomous body named "Puertos del Estado" ("State Ports") under the Ministry of Development. The reason for choosing this network of large workplaces is that they have an Equality Plan in place which has been approved by the Government of Spain, and one of the most important networks where it was lunched was in the Autonomous Centre for manage the most important Spanish Ports: "Puertos del Estado". Those ports are shown in Figure 2. The employment at ports was traditionally be masculinized, but nowadays women are also involved in this sector and is particularly important to boost women to engage in training, because on-the-job training is generally considered to be more important in high-skilled jobs (OECD,

2003)and it should be avoided to increase gender differences in access to such training, because it is likely to produce a larger wage gap among the high-skilled. The study aims to identify and quantify, where appropriate, the relationship existing between perceived equality, training courses conducted, and perceived satisfaction in the workplace, from a gender perspective. The work was carried out through the evaluation of perceived job satisfaction, perceived gender equality and efforts dedicated to job training. It was based on the European Working Conditions Survey

Figure 2: Spanish port system: the main ports.



Source: Puertos del Estado (2015)

2. Purpose of this work: analyzing self-perception's of wellbeing at work from a gender perspective

The success of equality plans, allows to achieve a more equal partnership between men and women. This success also translates into greater well-being for both genders. The welfare encompasses all aspects of life, and is determined both by feelings at work as feelings outside of work. Continuous learning and training are factors influencing wellbeing at work, not only because they generally give access to better positions, but also because they generate feelings of personal satisfaction. Therefore, it is expected that efforts in professional training positively affect the workplace wellness. This point can be considered overall for men and women. Nevertheless, women often are private of this possibility, due the gender inequality, because it is the woman who often take on household chores and caring for young children and elderly dependents(Grönlund and Magnusson,2016).

Training in the workplace improves the skills of workers, but, at the same time, it involves a cost to the company, in these circumstances, employers are often unwilling to invest in training women because they fear that their investment may not be as profitable as in men, precisely because of the family responsibilities that women take (Tam, 1997).

In this paper, our goal focuses on the influence of the overall aspects related to gender equality in personal wellbeing and the influence of this equality (promoted by equality plans) on such wellbeing. Equality plans take action at the working environment. If these plans work properly, it is likely that workers perceive greater wellbeing at work, and this perceived wellbeing, the greater will be, the higher the effective equality be(Polavieja, 2008). In addition, welfare at work affects the feelings outside of work. Also, equality plans allow workers better organizing their time, which could lead to attend more training courses, which also affect their welfare. Eventually, welfare at work results in general welfare. With the porpoise of testing this statements in the interesting experience of implementation the Equality Plans at the most important Spanish ports (those managed by "Ports of the State"), we formulated the next research questions:

Question 1: Identifying factors related to equality which determine the wellbeing at work in the main Spanish ports. Is there a causal relationship between the factors related to launching Equality Plans and wellness at work?

Question 2: Evaluate the extent that factors related to equality influence the welfare at work of employees in the Spanish Port System and check which ones have the greatest influence. Which of the explanatory factors has the greatest influence on wellbeing at work?

Question 3: Assess the extent to labor welfare of employees in the Spanish port system influences their overall well-being: How much is the influence of the welfare at work in the general welfare?

Question 4: Determining whether men and women have the same perceptions of the influence of factors related to equality, both in wellbeing at work, and general well-being: Do men and women have the same perceptions of the variables related equality?

3. Method

To answer our research questions, we need to work with variables like "Wellbeing at work", "Gender Equality", "Training" and "General welfare". These variables can not be measured directly. Then, we have "constructed" through a structural analysis of covariance, in basis to other variables directly observable. These variables are called constructs or latent variables, precisely because of the difficulty in measuring them directly(Jöreskog, 1970).To get the data for the observable variables, we conducted a survey. In basis to the EWCS, we elaborated an adapted short questionnaire and distributed on several ports of Spanish system. Ultimately with the data obtained and the analysis realized in Spanish ports, this paper has explained general feelings through the Structural Equation Model. This analysis system has become an important tool for hypothesis testing on components of wellbeing. With them we could get a measure of the feelings that

workers perceive regarding social and individual wellbeing and the influence of training received under the research of latent variables, which will give us indicators of the sample taken, so the use of structural equation tells us which of them has more or less influence. So, we have measured feelings at work such as good humor, joy, peace, energetic and active sensation, awakening refreshed and rested, and an interest in everything work-related. So, a questionnaire was conducted at the main Spanish ports. It was adapted from the 2010 questionnaire of the EWCS, which covered several aspects of working conditions, including physical environment, workplace design, working hours, work organization, well-being, and social/colleague relationships in the workplace. Demographic information was also collected(European Union. Eurofound, 2012).

The questionnaire was focused on the four main variables to analyze: the equality, the training, the wellbeing at work and the general welfare. For getting a representative sample of Spanish ports system, we decide to choose 14 of the 28 ports, taking account their specialization (on container traffic, bulk, etc.) and their geographical position. The questionnaires were sent by post to one worker at the port, who was contacted previously and who agree to help us. Finally, we got 174 valid questionnaires, from 94 men and 80 women Spanish ports. Factor related to Equality at work and the observed variables asked for assessing them. People who answered the survey have a good knowledge of the company. This is proved in Table 1, in which time they had been working on the port at the time of this survey is collected. The descriptive statistics for all items asked are shown in Table 2, in this table there are pointed the items related to the EWCS. The variable "Equality at work" was evaluated through authors own questions, because they have no similar questions at EWCS.The procedure, once the data was collected in the ports, has been to make a study using Structural Equation Modelling (SEM) to explain the causal relationships among some latent variables. (Latent variables are those that cannot be measured directly, so they are constructed using the indicators included in the survey.) Also the causal relationships among these variables are explained (i.e. the effect that each variable has on another).

Table 1. Working time in the port

Working time in the harbour	Frequency	%	Accumulated %
Less than one year	21	12,07	12,07
Between 1 and 2 years	7	4,02	16,09
Between 2 and 5 years	12	6,90	22,99
Between 5 and 10 years	33	18,97	41,95
More than 10 years	101	58,05	100,00

Table 2. Factor related to Equality at work and the observed variables for assessing them

Code	Wellbeing at work	Observable variable	Men		Women	
			Mean	SD	Mean	SD
W1	You have the fee ling of doing useful work (a)	Doing an useful work	4.415	0.739	3.775	0.927
W2	You know what is expected of you at work (a)	Know exactly what to do	4.309	0.880	4.038	0.818
W3	Your job gives you the feeling of work well done (a)	Doing a good work	4.266	0.806	3.863	0.791
W4	Your colleagues help and support you (a)	Support from my colleagues	4.287	0.697	4.075	0.689
	Training					
T1	The training has helped me improve the way I work (a)	Improved with training	4.500	0.730	4.288	0.660
T2	I have the skills to cope with more demanding duties (a)	Don't need training	4.489	0.699	4.338	3.383
T3	I feel my prospects for future employment are better (a)	Better future	4.266	0.857	3.738	1.076
E1	The company has mechanisms for promoting equality and work life balance (b)	Work life balance	3.266	1.184	2.788	1.187
	Equality at work					
E1	The company has mechanisms for promoting equality and work life balance (b)	Work life balance	3.266	1.184	2.788	1.187
E2	The Equality Plan of the company helps working conditions for equality are real and effective (b)	Effective equality plan	2.798	1.500	2.075	1.145
E3	Those responsible for personnel selection of the company comply with the principle of balanced presence between women and men (ie. that people of each sex not exceed 60%. or less than 40%) (b)	Gender balance	2.330	1.379	1.975	1.147
	General welfare					
GF1	I have felt cheerful and in good spirits (a)	Glad & happy	4.489	0.800	4.388	0.864
GF2	I have felt calm and relaxed (a)	Calm & relaxed	4.362	0.926	4.063	0.946
GF3	I have felt active and vigorous (a)	Active & vigorous	4.521	0.800	4.188	0.956
GF4	I woke up feeling fresh and rested (a)	Fresh & rested	4.255	0.915	3.850	1.148

(a) Item from EWCS-2010
(**) Authors own

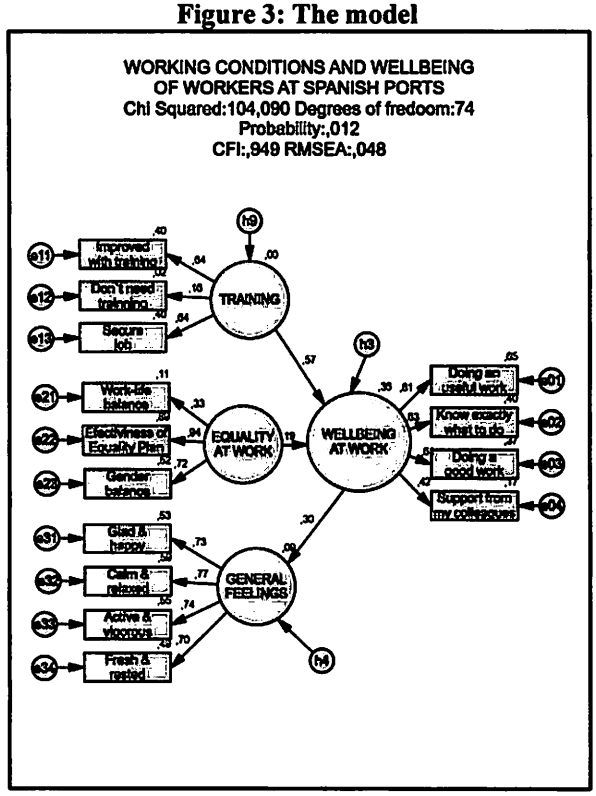
For responding the research questions 1, 2 and 3 a covariance structural analysis was applied to the whole sample. A structural equation model was carried on for this proposal. So, we could answer the questions formulated about the casual relation among the Equality Plans and the wellbeing at work (RQ1), the weights of the latent variables "Equality" and "Training" for explaining it (RQ2). Moreover the confirmatory factorial analysis lead us to prove and assess the influence of wellbeing at work and the general welfare (RQ3).

4. Results and discussion

4.1. Structural equations model

In order to answer the Research Questions (RQ1, RQ2, RQ3), we will test the hypothesis H1: The equality issues have not influence on wellbeing at work, for the employees at Spanish Ports System, H2: The training has not influence on wellbeing at work, and H3: The wellbeing at work has not influence in the general welfare. We used a structural equation model (SEM).The results of the whole model are shown in Figure 3 and tables 2b and 55. Moreover, Figure 3 represents the structural model and the standardized results. The model was estimated by the maximum likelihood method.

Figure 3: The model



4.1.1. The fit

The fit index shown in Table 3. Al values indicate that the fitting of the model is good.

Table 3: Fit of the model

Fitindex	Score	Reference marks	
		Good fit	Acceptable fit
Chi-squared	104.09		
Degrees of freedom	74	1 ≤ Chi-Squared ≤ 2df	2df ≤ Chi-Squared ≤ 3df
Significant	0.012	0.5 ≤ P ≤ 1.00	0.1 ≤ P ≤ 0.05
Chi-Squared/df	1.407	0 ≤ Chi-Squared/df ≤ 2	2 ≤ Chi-Squared/df ≤ 3
RMSEA (Root mean square error of approximation)	0.048	0 ≤ RMSEA ≤ 0,05	0.05 ≤ RMSEA ≤ 0.10
CFI (Coomparative fit index)	0.949	0,95 ≤ CFI ≤ 1,00	0,94 ≤ CFI ≤ 1,00
GFI (Goodness of fit index)	0.933	0.95 ≤ GFI ≤ 1	0.90 ≤ GFI ≤ 9.95
AGFI (Ajusted goodness of fit index)	0.905	0.90 ≤ GFI ≤ 1	0.85 ≤ GFI ≤ 0.90

4.1.2. Causal relations: the estimators

Table 4: Estimators and their significance

Regression Weights			Estimate	Standarized Estimate	S.E.	t.	P
Training	→	Wellbeing at Work	0.450	0.568	0.122	3.688	***
Equality at Work	→		0.102	0.189	0.047	2.178	0.029
Wellbeing at work	→	General Welfare	0.439	0.303	0.144	3.042	0.002

All the relations tested among the constructs are significant (Table 4). So we have proved the expected influences among them. Our first research question was trying to identify the factors related to equality which determine the wellbeing at work in the main Spanish ports and find a possible a causal relationship between the factors related to launching Equality Plans and wellness at work?. Our second research question was trying to evaluate the extent that factors related to equality influence the welfare at work of employees in the Spanish Port System and check which ones have the greatest influence, so we tried to answer the question of which of the explanatory factors has the greatest influence on wellbeing at work.

Our model has shown that the constructs *equality at work* and *training* influence positively (coefficients are 0.189 and 0.568 respectively) and significantly ($p = 0.029$ and $p<0.001$ respectively) to *Wellbeing at work*. So we can conclude that we have identify at least two factors which influence positively the wellbeing at work, and we can summarize this relation in Equation(1), and that that the greatest influence on the positive feeling at workplace are linked to the training (as it is shown for the higher score of the construct *training*. Nevertheless we are aware of the importance of work-life balance for women, in order they can attend training courses and their family life at the same time.

$$WW = 0.568\,T + 0.189\,EW \qquad \text{Equation(1)}$$

We have hypothesized that:

- H1: The equality issues have not influence on wellbeing at work, for the employees at Spanish Ports System
- H2: The training has not influence on wellbeing at work, and

For testing the H1 hypothesis we attended to the relation among the constructs *equality at work* and *Wellbeing at work*. We have got a significant ($p<0.029$) causal relation, and the regression coefficient is positive (0.189), what is meaning that the higher is the equality at workplace the higher is the *Wellbeing at work*. So, H1 is rejected. And we state that the employees at Spanish ports perceive a positive relation between the equality at workplace and their wellbeing at work.

Equation(1) lead us to say that we should reject H2 hypothesis, because the latent variable *training* has shown significant for determining the *Wellbeing at work*.

The third research question was related to de assessment the influence of labor wellbeing of employees in the Spanish port system on their overall well-being, and evaluate its extent. As the latent variable *welfare at work* has been shown has significant ($p = 0.002$) for explaining the *general welfare* construct, with a standardized regression coefficient 0.303, we are able to responding our question positively: the higher is the wellbeing at work the higher is the general welfare.

In consonance with the response to our third research question, we have to reject H3 hypothesis:

- H3: The wellbeing at work has not influence in the general welfare.

4.1. Mean differences

For responding the last research question: Determine whether men and women have the same perceptions of the influence of factors related to equality, both in being at work, and general welfare, we have stated the hypothesis below, and we have conducted a t Student test and Levene test for mean comparison. Related to this question, we have formulated the next Hypothesis:

- H4: Women and men perceptions about equality issues are the same
- H5: Women and men perceptions about training issues are the same
- H6: Women and men perceptions about wellbeing at work are the same
- H7: Women and men perceptions about general welfare are the same

The t Student and Levene test for mean comparison results are shown in Table 5:

Table 5. T student and test the Levene: items shown mean differences

	Levene test for equal variances		Prueba T para la igualdad de medias		
Items	F	Sig.	t	Fd	Sig. (two-tiled)
You have the feeling of doing useful work[(b)]	5.717	0.018	4.972	150,219	0.000
You know what is expected of you at work[(a)]	0.416	0.520	2.090	172	0.038
Your job gives you the feeling of work well done[(a)]	1.089	0.298	3.319	172	0.001
Your colleagues help and support you[(a)]	0.627	0.429	2.011	172	0.046
The training has helped me improve the way I work[(a)]	0.743	0.390	2.000	172	0.047
I feel my prospects for future employment are better[(a)]	2.762	0.098	3.604	172	0.000
The company has mechanisms for promoting equality and work life balance[(a)]	0.216	0.643	2.653	172	0.009
The Equality Plan of the company helps working conditions for equality are real and effective[(b)]	7.511	0.007	3.600	170,088	0.000
I have felt calm and relaxed[(a)]	0.604	0.438	2.104	172	0.037
I have felt active and vigorous[(a)]	1.316	0.253	2.508	172	0.013
I woke up feeling fresh and rested[(a)]	3.151	0.078	2.590	172	0.010

[(a)]Equal variances are assumed.[(b)]Equal variances are not assumed

4.2. The equality

The null hypothesis H4: Women and men perceptions about equality issues are the same was tested in basis to the items E1, E2 and E3. The results have shown statistical significant mean differences for E1 (Work life balance) and E2 (Effective equality plan) (Table 5). The means scores in responses to the question "The Company has mechanisms for promoting equality and work life balance" for men and women are, respectively, 3.266 and 2.788, showing that women perception of the implemented mechanisms for promoting equality is lower than the men. The work-life balance is appreciated as quite good for men (scores >3), but don't get the "pass mark" for women.

Similar situation is showed for E2, question which is assessing the perceived effectiveness of the equality plan. Women means score is 2.075, lower than men score (2.798) showing that their perception is that the effectiveness of the Equality Plan is not as good as the males (Table 2). Nevertheless, we have to point out that evaluation, of the real and effective application of the Equality Plan, has scores under 3, for both sex, which is a poor assessment.

Both of those items (E1 and E2) lead us to reject the null hypothesis H4 with a significances of 0.009 (E1) and <0.001 (E2). The latent variable "Equality" is constructed for three items, only one of them shown not mean differences (E3 - Those responsible for personnel selection of the company comply with the principle of balanced presence between women and men - that people of each sex not exceed 60%. or less than 40%), moreover this is item is quite observable and free of subjectivity, because gender balance in the firm is quite easy of probing. Our conclusion for testing H4 is that it should be rejected, because we have probed that women perceptions of equality are lower than men perceptions.

4.3. Training

Equal means hypothesis for H5: Women and men perceptions about training issues are the same, should be rejected. We have found differences on means for the items T1 (The training has helped me improve the way I work), T3 (I feel my prospects for future employment are better) and E1 (The Company has mechanisms for promoting equality and work life balance analyzed in the previous part).

Only the item T2 (I have the skills to cope with more demanding duties) has no shown differences. For the training as a mechanism for improvement at work, as well as for the feelings of possibilities of promotion through the training, women scores are lower (4.288 and 3.738, respectively) than the men (4.500 and 4.266, respectively). The importance of item E1 for training is crucial, because without work-life balance most women couldn't attend the training courses. So, the hypothesis H5 is rejected.

4.4. Wellbeing at work

H6: Women and men perceptions about wellbeing at work are the same, is rejected for all the items involved in general welfare (W1, W2, W3, W4), with a respective significance level of under 0.001 per cent, 0.038 per cent, 0,001 per cent and 0.046 percent.

The mean score achieved for women responses for the question "you have the feeling of doing useful work" (W1) is 3.775, and for men is 4.415, so women's feelings about the useful of their work is lower than the man. For the item W2, evaluate through the question "You know what is expected of you at work" respective mean for women and men are 4.309 and 4.038. Women's means are lower than men's, then the women are not so sure about what is expected from their work. The means scores for query "Your job gives you the feeling of work well done" are 4.266 (men) and 3.863 (women), which means that this satisfaction feeling is less assessed for women. The last question related to Hypothesis H7 "Your colleagues help and support you" is pointing to the same direction that the previous ones: means for men are higher (4.075) than women (4.287), that is to

say: women don't feel so much supported by their colleagues at workplace than their masculine fellows.

All items indicate a lower level of well-being perceived by women, and in all cases the differences in averages are statistically significant, as a consequence, rejecting the null hypothesis H6 leaves no doubt.

But discrimination at labor market is still remaining for women in many parts of the world, and female face different types of discrimination at their workplaces, even if men and women possess the same factors such as the education level and experiences(Othmanand Othman, 2015). This fact could explain that female's perception of effectiveness of policies boosting equality seems to be lower than the men perception.

4.5. The general welfare

The null hypothesis H7 (Women and men perceptions about general welfare are the same) has shown differences in means for three of the four items, with a significance level of 0.04 (Table 5). Women feel less calm and relaxed (mean 4.063 women, 4.362 men), less active and vigorous (mean 4.188 women, 4.521 men) and they wake up feeling less fresh and rested (3.850 women, 3.850 men) than men (Table 2). Nevertheless the scores are quite high for all, what means that the respondents to our questionnaire general welfare is quite good. In basis to the analyzed results, the Hypothesis H7 is rejected.

5. Conclusions

The legal framework for equality is the first step, but more effort should be done by entrepreneurs and policy makers. Both women and men, agree about the poorness of real effectiveness of Equality Plan, but women's perception about this effectiveness is even lower than the men. The work-life balance is still over the woman's shoulders, as we have stated through analyzing the differences in perceptions between sexes.

We have identify at least two factors which influence positively the wellbeing at work: the equality and the training, so it remarks the importance of Equality Plans for boosting welfare at work. And we have proved that there is a positive relation among positive feelings at work and general good feelings, because we have accomplish, as a result of our research model, that the higher is the wellbeing at work, the higher is the general welfare.

Moreover, we have achieved the result that the employees at Spanish ports perceive a positive relation between the equality at workplace and their wellbeing at work. So, if there is a "chain" relation as the one showed in figure 44, the Equality Plans are so important for increasing population general welfare, which positive effects on such a high number of issues, as health, for example, is out of

the extent of this work, but we are aware that the efforts for boosting equality at workplace is a matter which implications goes beyond the intention of solving work-life balance and supporting women's rights. About the causal relationship between perceived gender equality in the workplace and the wellbeing perceived in the workplace, we would like to point out that, since perceived gender equality, based on the work presented here, is measured on one pioneer sector applying Equality Plans, we consider it necessary that the practical implications that could indicate causality should be analyzed in more sectors for getting a more extended and strong assessment.

About differences on men and women perceptions about equality and training issues, for the employees of Spanish Ports System, we have verified that female has lower perceptions, and is the same with wellbeing at work and general welfare.

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